COMMERCIAL FISHERIES ABSTRACTS

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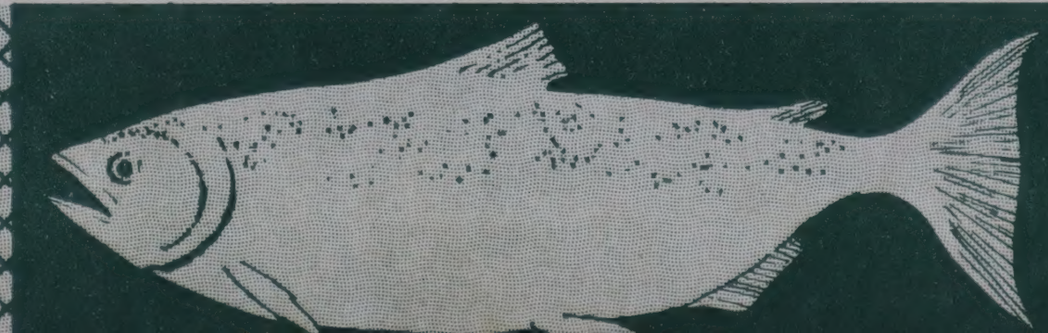
U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES



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0.33 (*) PRODUCTS OF OXIDATION OF A PROTEIN THIOL GROUP AFTER REACTION WITH VARIOUS OXIDIZING AGENTS

Little, C., and P. J. O'Brien (Department of Medical Biochemistry and Pharmacology, University of Birmingham, Birmingham 15, England)
Archives of Biochemistry and Biophysics 122, No. 2, 406-410 (November 1967)

Oxidizing agents can either convert thiols to disulfides or to sulfinates and sulfonates, which are higher oxidation products. Thus, not all the thiol groups are oxidized to disulfides. The oxidation of cysteine by iodate, bromate, or persulfate forms the disulfide cystine. There is also evidence that the products of hydrogen peroxide oxidation of protein thiol groups in papain and in reduced ribonuclease are not disulfides. Disulfides can be formed only if the thiol groups are sterically free to interact, so the relative proportions of the different oxidation products of thiols may depend on the relative accessibility of the thiol groups. Strong oxidizing agents have an increased tendency to oxidize thiols past the disulfide stage.

The cytochrome c of baker's yeast (Saccharomyces oviformis) contains one free cysteinyl residue. Reaction of the cytochrome with cupric ions causes the formation of a dimer containing no copper and no free thiol groups; the dimer may be reversed to the monomer by treatment with an excess of small thiol or sulfite ions. It would appear that cupric ions oxidize the protein thiol to an intermolecular disulfide. Therefore, yeast cytochrome c is a useful protein for studying the oxidation products of a protein thiol group by various oxidizing agents under

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 ABSTRACTER: M. F. Tripple

0.4 GENTLE TREATMENT IS KEY TO PROTECTION OF EYES

Schweisheimer, W.
National Fisherman 48, No. 11, 8C (February 1968)

Eye emergencies in the fishing industry have assumed tremendous importance because of their steadily increasing number and their high cost to both management and labor. Several of the injuries most commonly affecting fishermen are discussed.

Conjunctivitis affects both fishermen and those who handle fish. It is an inflammation of the conjunctiva, the delicate membrane that lines the eyelids and covers the white of the eye. It may be caused by intense light, glare from the sun, or direct contact of water with the eye--as during rough weather conditions. It may also be caused by handling eels, whose blood has an irritating constituent that produces redness of the eyelids and bloodshot, watering, burning eyes. The irritating substance may also affect the cornea (the transparent part of the eye that covers the iris and the pupil). The author suggests that cold compresses and dark glasses should be used to relieve the painful sensation until treatment by the doctor can be started.

In older fishermen a peculiar, triangular yellow swelling may form on the side of the cornea, usually on the side nearest the nose. These "pingueculas" are caused by age as well as by steady exposure to wind, rain, and dust. Although many fishermen upon first noticing the swelling become greatly concerned

(over)

 ABSTRACTER: L. Baldwin

PRODUCTS OF PROTEIN THIOL OXIDATION

PROTECTING THE EYES

0.5 (*) IMPROVED MEDIUM FOR SPORULATION OF CLOSTRIDIUM PERFRINGENS

Duncan, Charles L., and Dorothy H. Strong (Department of Foods and Nutrition, University of Wisconsin, Madison 53706)
Applied Microbiology 16, No. 1, 82-89 (January 1968)

As it is quite difficult to obtain a satisfactory degree of sporulation for many strains of Clostridium perfringens, the objective of this study was examination of the effect of selected components within a medium on the degree of sporulation induced. The authors hoped that this approach would result in a medium that would stimulate maximal sporulation.

The most abundant spore crops are usually obtained with the Ellner medium (1956), and this medium has been commonly used for this purpose. The SEC broth of Angellotti et al. (1962) produces fewer spores than the Ellner medium, but it is recommended for producing spores capable of surviving 100° C. For a comparison, the heat resistance of the spores produced in certain of the media was determined.

An improved sporulation medium was developed in which all five strains of C. perfringens were tested. The strains showed a 100- to 10,000-fold increase in numbers of spores when compared with spore yields in SEC medium under comparable conditions. Three of the five strains produced a 100- to 10,000-fold increase, with the remaining two strains yielding about the same numbers of

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 ABSTRACTER: M. F. Tripple

0.6 (*) THE ROLE OF TECHNICAL ASSISTANCE IN FOOD INDUSTRY DEVELOPMENT

Kertesz, Z. I. (FAO/WHO/UNICEF, Protein Advisory Group, United Nations Headquarters, New York, N.Y. 10017)
Food Technology 21, No. 9, 48, 50-52 (September 1967)

The author's premise is that, despite intensified efforts, the current status of economic development in the underdeveloped countries of the world is disappointing. Some of these nations have shown less economic growth in the past 10 years than they did in the previous 10. At the same time, the highly industrialized nations are advancing at an unprecedented rate, and the gap between the rich and the poor nations is steadily widening. This slow development is occurring despite scores of technical assistance missions, over 50 billion dollars of aid poured into the poorer parts of the world, and some 30 billion dollars of private capital invested. Although some countries have made progress in overcoming their development problems, the worldwide situation does not justify complacency. It is the author's opinion that the lack of satisfactory development is more often due to social, political, and psychological factors than to factors involving economics or technology.

The author states that food processing plays an important role in the economic development of any nation. Technical assistance of all types is a major approach through which economic development is catalyzed in the underdeveloped countries. The effectiveness and lasting usefulness of technical

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 ABSTRACTER: M. F. Tripple

MEDIUM FOR SPORULATION OF CLOSTRIDIUM PERFRINGENS

TECHNICAL ASSISTANCE IN FOOD INDUSTRY DEVELOPMENT

0.4 (Cross Reference: 2.119)

that something irreparable has happened to their eyes, pingueculas are of little importance and rarely cause trouble for the person who is affected.

Some people who have to work with shellfish develop keratitis, an inflammation of the cornea. This problem is caused by small particles of the shell reaching and injuring the eye during shucking. Usually, the movement of the eyelids and the tears produced when the particle hits the eye will remove the particle and the irritating chemical substances that are contained in the shell. In most cases, the lesion heals quickly without lasting damage to the eye. But when the little wound produced by the particle is deeper, the problem is serious and a doctor should be consulted.

Nature provides a very efficient method of cleansing the eye--tears and blinking eyelids. If a foreign body is not removed by this natural method, it may be possible for someone trained in first-aid procedures to lift it out with the clean corner of a handkerchief or a clean piece of blotting paper or to flush it out with a nonirritating solution. If these measures do not work, the foreign body is probably embedded. Under no circumstances should one try to remove the foreign body by rubbing it out. Such a resort will only embed it more deeply and tend to cause serious damage to the eyesight.

A form of cataract has also been noticed among fishermen; on various occasions an epidemic of these cases occur. This form of cataract is caused by the larvae of ringworms excreted by seagulls and found on the skin of fish. Fishermen get it by drinking infected water or allowing their eyes to come into contact with the unclean skin of fish. Only an operation can restore eyesight lost by cataract.

0.6

assistance must be increased, and the factors that determine the effectiveness of technical assistance in food technology and food industry development must be assessed. To do this, the author feels it would be useful to pinpoint some of the difficulties encountered and the lessons learned from experience.

Many of the problems the author discusses in this article are not new; however, these problems warrant reemphasis as they have been encountered by governments and by companies attempting to establish food-manufacturing enterprises in the underdeveloped countries. A critical evaluation of the past performance of technical assistance is also appropriate, considering the recent discussions on the principles of technical assistance and foreign aid. In this article, the author discusses some of the factors related to the work of food technologists and technical assistance assignments.

0.6 IMPROVED COOKING SALT CONTAINING ALL THE MINERALS OF THE SEA

French Patent 1,439,868
Chemical Abstracts 66, No. 7, 27874n (February 13, 1967)

0.33

various conditions. In this investigation, the possible disulfide (dimer) formation due to the effects of various oxidizing agents on the thiol group of yeast cytochrome c was investigated using molecular sieve chromatography.

A series of oxidants caused thiol oxidation in the monothiol yeast cytochrome c; however, only the weaker oxidants caused disulfide formation. The stronger oxidants caused the exclusive formation of monomeric oxidation products. The weaker oxidants were cupric sulfate, o-iodosobenzoate, and potassium ferricyanide; the stronger oxidants were N-bromosuccinimide, iodine, hydrogen peroxide, and a lipid peroxide. High concentrations of ferricyanide and o-iodosobenzoate caused the formation of both monomeric and dimeric oxidation products. An acidic pH favored higher oxidation by o-iodosobenzoate. The authors postulate that the oxidation mechanism involves two competitive reactions: (1) a reaction producing disulfide dimers, and (2) a reaction requiring a strong oxidant and producing a highly oxidized monomeric product, probably the sulfonic acid. The efficiency of thiol oxidation by peroxides in yeast cytochrome c was much lower than in other proteins or small thiols. This lowering of efficiency is probably due to competition by the hematin residue for the oxidizing species produced by the peroxides. [21 references]

0.3 VERY FAST REACTIONS IN SOLUTION

Hammes, Gordon G. (Cornell University, Ithaca, New York)
Science 151, No. 3717, 1507-1511 (March 25, 1966)

The available methods are described for investigating the molecular details of chemical reactions in the range of from 1 to 10^{-10} second. [15 references]
[Abstracter: L. Baldwin]

0.5

spores, when compared with strains cultured in Ellner medium. At the 40-hour sampling time, 18 out of 27 strains produced a 10- to 100-fold increase in numbers of spores in the improved medium, as compared to spore production obtained in a medium recently reported by Kim et al. (1967).

The new medium contained 0.4 percent yeast extract, 1.5 percent proteose peptone, 0.4 percent soluble starch, 0.1 percent sodium thioglycolate, and 1.0 percent $Na_2HPO_4 \cdot 7H_2O$. In some cases, addition of activated carbon to the new medium could increase the spore yield. The inclusion of activated carbon in the medium resulted in spores with slightly greater heat resistance than spores produced in the improved medium without added carbon or in the SEC or Ellner media. The major differences in heat resistance of the various strains of C. perfringens appeared to be genetically determined, rather than determined by the particular sporulation medium. A definite heat-shock requirement was shown for four of the five strains; optimal temperature ranged from 60° C. for a heat-sensitive strain to 80° C. for a heat-resistant strain. Heating for 20 min. at the optimal temperature resulted in a 100-fold increase over the viable count obtained after heating for the same length of time at 50° C. [12 references]

0.38 A COMPARATIVE STUDY OF MOLLUSCAN AND MAMMALIAN ARGINASES

Campbell, James W. (Rice Univ., Houston, Texas)
Chemical Abstracts 65, 2541d (July 18, 1966)

0.7 (*) PAYING THE PIPER

Ehrlich, Paul (Department of Biological Sciences, Stanford University, Stanford, California)
New Scientist 36, No. 575, 652-655 (December 14, 1967)

The author feels that the point has been reached where there is no way in which the population of the world can be fed. In his opinion only a drastic and immediate reduction of the world's population and birthrate can prevent faminine in the future. Others have suggested increasing the amount of food available, so the author explores the problem of increasing food supplies from the sea and denounces what he calls the "sea-farming myth."

The following are the author's opinionson food from the sea. With few exceptions, man hunts food from the sea; he neither farms it nor herds its animals. At the present time, he cannot take advantage of the primary production of the sea and must use levels in the food chain at which much of the energy from the sun, which, bound by photosynthesis, has been lost in inefficient transfers from producer to primary consumer and so on up the food chain. There are disturbing signs that the present yield from the sea will be threatened by over exploitation of the fisheries.

If fishing from the sea becomes futile, another possibility is farming the sea. The sea farming done now is insignificant in that less than one-tenth of

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 ABSTRACTER: M. F. Tripple

1.0154 (*) JAPANESE SALMON MOTHERSHIP FISHERY

Neo, M.
Paper presented at the Second World Fishing Gear Congress, London, 25-31 May 1964, 25 pp. (French and Spanish summaries)
World Fisheries Abstracts 16, No. 2, 17-18 (April-June 1965)

The Japanese mother shipshandling salmon in the North Pacific are subject to international agreements governing the high-seas fisheries of the North Pacific as well as to domestic Japanese regulations defining operating areas and the number and mesh size of nets to be used by each catcher boat. East of the "Bulganin line," they may fish 330 nets (15 km. of net) and west of it, 264 nets (12 km. of nets). Since 1961, half of the nets must be of 121-mm. and the other half of 130-mm. stretched mesh.

In 1962, 11 fleets operated with 369 catchers. A fleet normally consists of a mother ship of from 7,000 to 10,000 gross tons containing a canning capacity of up to 9,000 cases of salmon a day, a reduction plant for offal, and often a quick-freezing plant; and from 30 to 36 catcher boats, each having a capacity of 75-85 gross tons, a horsepower of 280-400, mechanical net haulers at the bow, and belt conveyors to transport the nets to the stern. The nets are normally of 210d/15 multifilament, single-knot, nylon; however, monofilament nylon nets, 50 to 100 nets per boat, are often interspaced among the other nets so that fish will blunder into the transparent sections. The mother ship prepares daily charts

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 EXTRACTOR: L. Baldwin

0.8 CRITICAL PRESSURE OF PLATONIC POLYHEDRONS UNDER EXTERNAL HYDROSTATIC PRESSURE

Stachiw, J. D. (Deep Ocean Engineering Division, U.S. Naval Civil Engineering Laboratory, Port Hueneme, California)
Journal of Ocean Technology 2, No. 1, 59-60 (December 1967)

Platonic, or regular, polyhedral hulls may be useful in stationary installations. By determining experimentally their reaction to external hydrostatic pressure, the author was able to draw conclusions about their structural strength in relation to that of a spherical hull.

Five hollow polyhedrons were made of 0.250-inch-thick plexiglass and five of 0.025-inch-thick cold-rolled steel. The dimensions were so set that each of the polyhedrons' corners touched the surface of an imaginary circumscribed 10-inch-diameter sphere. Using water as the pressurizing medium, the author determined the critical pressure of the polyhedral and the spherical models. Critical pressure of the plexiglass models was that pressure at which a panel or panels fractured catastrophically; critical pressure of the steel models was the maximum hydrostatic pressure immediately preceding the first sudden drop in applied pressure. Results of the tests are tabulated on the back of the card.

Failure in the plexiglass polyhedrons was marked by fracturing of one or more of the panels; failure of the sphere, by its complete disintegration into (over)

 ABSTRACTER: L. Baldwin

1.82 SOME FACTORS INFLUENCING REBURROWING ACTIVITY OF SOFT-SHELL CLAM, MYA ARENARIA

Pfitzenmeyer, H. T., and K. G. Drobeck (University of Maryland, Natural Resources Institute, Chesapeake Biological Laboratory, Solomons, Maryland 20688)
Chesapeake Science 8, No. 3, 193-199 (September 1967)

The soft-shell clams (Mya arenaria) of Maryland live entirely in a subtidal environment and must be harvested by the hydraulic clam dredge. The efficiency of this mechanical operation is quite high, and the dredge collects about 95 percent of the clams in its path with practically no shell breakage. The hydraulic gear is not selective, and all sizes of clams are dredged from the bottom. Some sorting of clams does take place on the conveyor belt, which carries the dredged clams to the operator in the boat; he selects the sizes he wants to keep. Undersized clams, or those that are too large for market, are allowed to fall back overboard, and they come to rest on the bottom near the point where they were dredged. When the density of clams is too great or the conveyor belt is left unattended, all size groups of clams fall back into the water.

During periods of calm water and low turbidity, live clams and large accumulations of exposed shells may be seen resting on the bottom in areas where commercial dredgers have worked. The fate of the live clams is not known; some are seen actively trying to reburrow while others appear to remain quiescent. After a few days, the majority of live clams are not visible on the bottom. These (over)

 ABSTRACTER: M. F. Tripple

FEEDING THE WORLD POPULATION

BEHAVIOR OF POLYHEDRONS UNDER HYDROSTATIC PRESSURE

JAPANESE MOTHER-SHIP FISHERY FOR SALMON

REBURROWING ACTIVITY OF SOFT-SHELL CLAM

0.8

very small fragments. Failure in the steel models, buckling of the edges, was preceded by a considerable amount of deformation of the panels.

Model shape	Volume (cu. in.)	Plexiglass models			Steel models		
		Weight (lb.)	Buoyancy (cu.in/ lb)	Critical Pressure (Pcr) (p.s.i.)	Weight (lb.)	Buoyancy (cu. in/ lb)	Critical Pressure (Pcr) (p.s.i.)
Tetrahedron	64	1.2	53.2	170	0.80	80	26
Hexahedron	192	2.1	91.5	100	1.36	140	23
Octahedron	166	1.8	92.5	180	1.18	141	28
Dodecahedron	348	2.3	151.0	160	1.49	233	26
Icosahedron	317	2.6	122.0	380	1.63	194	35
Sphere	523	3.4	154.0	1130	2.13	245	*320

*Calculated.

The author concludes from these data that the compressive strength of a regular polyhedron is appreciably inferior to that of a sphere, even when inclosed volume, weight, and buoyancy are considered. The small amount of spread between the critical pressure of the steel polyhedrons suggests that a polyhedron's stability is not responsive to its shape. Although the structural efficiency of regular polyhedral hulls increases with the number of faces of the hull, none of the hulls is as efficient as a sphere of the same material and diameter.

0.7 (Cross Reference: 9.16)

1 percent of the fisheries' yield is from farming. As sea farming now is done along the shoreline, it is viewed by the author as an extension of terrestrial farming. No deep-sea farming is being done, even on an experimental basis, and the technical knowledge is lacking with which to start. Some people think that, with colossal effort and strict international controls, the yield from the sea might conceivably be doubled within the next 10 years. The author points out, however, that such an effort is not being made and that such controls are not being developed. Experience with attempting such controls in the international whaling industry gives little hope that they will be effective, even if imposed. From the point of view of what he terms "the impending crisis," the author feels we can relegate the idea of saving mankind by tapping marine food supplies to the same fairyland as that occupied by hydroponics, food made from petroleum, and desalinization plants used to convert deserts into granaries.

The conclusion of the author is that attention today is focused on the symptoms of the problem--food shortage, environmental deterioration, pestilence, and war. This focus must be shifted to the cause of the problem, overpopulation, and radical solutions must be applied.

A review of the developments in the field of essential fatty acids in the past decade is given.

Rahm, Joseph J., and Ralph T. Holman
Annual Report of the Hormel Institute, 1963-1964, p. 34 (University of Minnesota, Minneapolis)

0.7 ESSENTIAL FATTY ACIDS

1.82

dredged bottoms attract concentrations of predatory fish and crustaceans that feed on the exposed clams.

It was not known what percentage of clams were able to burrow or if all size groups were capable of reburrowing. The present experiment was designed to study the behavior of larger clams in three size groups averaging 45, 60, and 74 mm. in shell length. Two other environmental variables--water temperature and bottom particle size--were tested to determine if they influenced clam reburrowing. The three size groups of clams were placed in aquaria and their rate of reburrowing was measured. The substrate of each aquarium consisted of sand particles of the following sizes: less than 0.5 mm., 0.5 to 1 mm., 1 to 2 mm., 2 to 4 mm., and an equal combination of the four sizes. New specimens were tested at every 5° C. rise or fall in ambient water temperature. Observations were made periodically for 48 hours.

The three variables--water temperature, clam size, and sediment particle size--were highly significant at the 1-percent level in influencing clam-reburrowing activities from the end of the second hour to the termination of the experiment 46 hours later. Optimum water temperatures for reburrowing were between 8.8° and 21° C. After 48 hours, 62 percent of the small, 39 percent of the medium, and 21 percent of the large clams had reburrowed. The aquarium with substrate particle size of less than 0.5 mm. had the greatest percentage of reburrowed clams of each size. Progressively less reburrowing occurred as the particle size increased. Most reburrowing occurred between 4 and 8 hours after the start of the experiment.

1.0154 (Cross Reference: 2.118)

and allocates operational areas to each catcher boat, normally within a range of 50 miles. The catcher boats set their nets immediately before sunset across the expected run of the salmon. When the wind force exceeds 7 or 8 meters per second, the nets are always shot into the wind. Hauling begins at about 1 a.m. When weather and sea conditions allow, the catchers moor alongside the mother ship to unload their catches and receive stores, but in rough seas, the catcher boat lies to windward of the mother ship, and the fish are hauled through the sea in 800-kg. wire baskets.

The 12th session of the Indo-Pacific Fisheries Council heard reports on significant changes taking place in the fisheries of the Indo-Pacific, such as the expansion of trawling in the Gulf of Thailand, where the catch increased from 78,000 tons in 1962 to 340,000 tons in 1965. This expansion has brought changes in Thailand's administration and investigation of its fisheries. On the basis of Thailand's experience, it is estimated that the Southeast Asian countries may anticipate a trawl catch of 2,000,000 tons per year. [Abstracter: E. R. Weissman]

Kesteven, G. L. (CSIRO, Australia)
Australian Fisheries Newsletter 25, No. 12, 21 (December 1966)

1.0158 INDO-PACIFIC FISHERIES UNDERGO BIG CHANGES

1.84 (*) FLORIDA'S CALICO SCALLOP BEDS UNTAPPED SOURCE FOR FREEZING

Anonymous
Quick Frozen Foods 30, No. 7, 133-134 (February 1968)

Frozen seafood packers are forced to contend with the problem of finding more raw material. Present shortages in supplies of scallops have forced the price of frozen scallops to record high levels; prices rose 20 to 30 cents during the last months of 1967. Large concentrations of calico scallops (Pecten gibbus) off the east coast of Florida offer an untapped source of raw material for frozen shellfish processors once the scallop fishery is developed for commercial use. Government tests have shown that the meat of the calico scallop withstands rigorous processing methods and freezer storage with no apparent reduction in quality. The meat of the calico scallop is more tender than that of the larger sea scallop and is similar to that of the bay scallop, a variety found in New England waters. At the present time, most of the U.S. supply of scallops comes from the northeastern coast.

A North Carolina company is currently freezing the calico scallop. The president of the company has designed a machine for the mechanical shucking of the scallops; the machine has an output of 1,000 bushels in 15 hours. Scallops may also be shucked by hand; however, this method yields only 60 to 70 bushels a day. The president believes the calico scallop is easier to shuck than bay scallops. He pointed out that the Florida fishing industry has not developed

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1.85 SHRIMP EXPLORATION ON THE BRITISH COLUMBIA COAST, 1967

Smith, M. S., and T. H. Butler (Fisheries Research Board of Canada Biological Station, Nanaimo, British Columbia)
Circular No. 85, 41 pp. (February 1968) (Fisheries Research Board of Canada Biological Station, Nanaimo, British Columbia)

The Fisheries Research Board of Canada conducted a survey to find concentrations of shrimp on the outer Continental Shelf of British Columbia. The area surveyed lay between 126° and 131° West Longitude and 49° and 54° North Latitude. The survey consisted of studying areas considered to have commercial potential and re-assessing the potential of grounds found in previous explorations.

The deck equipment of the 80-ton, 220-hp. vessel included a hydraulic-powered combination seine-trawl winch and a hydraulic net reel conventionally rigged for double-gear trawling. Sampling was done with a 70-foot Gulf of Mexico heavy-duty semiballoon trawl. A light groundline and rubber rollers were attached to the footrope of the net to reduce the number of flatfish caught and to protect the net. The net and otter boards were rigged as for a conventional groundfish trawl. Double-gear trawling was done; one wire from each winch drum ran through its respective stern davit and was attached to the rear quarter of the otter board.

The most important shrimp found was the smooth pink shrimp, Pandalus jordani. The pink shrimp, P. borealis, was caught in inlets along with the smooth pink shrimp. The second most abundant shrimp caught was the sidestripe shrimp,

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2.01 (*) ACTION OF MICROORGANISMS ON THE PEROXIDES AND CARBONYLS OF RANCID FAT

Smith, James L., and John A. Alford (Eastern Utilization Research and Development Division, Agricultural Research Service, U.S. Department of Agriculture, Beltsville, Maryland 20705)
Journal of Food Science 33, No. 1, 93-97 (January-February 1968)

Microorganisms have been reported to be capable of decomposing hydroperoxides and of utilizing aldehydes. No reports exist concerning the action of microorganisms on rancid fats that contain hydroperoxides and carbonyls. Carbonyl compounds, which are formed by decomposition of hydroperoxides, have been found to cause flavor changes in certain foods. Therefore, the authors decided to investigate the effect of microorganisms on the peroxides and monocarbonyl content of rancid lard.

The effects of 26 species of bacteria, molds, and yeasts on the hydroperoxides and monocarbonyls in rancid fat was determined. All the cultures of microorganisms were capable of decomposing the hydroperoxides. The activity of the microorganisms on the monocarbonyl content of the rancid fat was so varied that the microorganisms were divided into the following categories: (1) those that produced large increases in at least two monocarbonyl classes; (2) those that removed 2,4-dienals; (3) those that removed 2,4-dienals and 2-enals; and (4) those that caused decreases in at least two classes of monocarbonyls without completely destroying any class.

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2.05 (*) USE OF PHENOLPHTHALEIN DIPHOSPHATE AGAR WITH POLYMYXIN AS A SELECTIVE MEDIUM FOR THE ISOLATION AND ENUMERATION OF COAGULASE-POSITIVE STAPHYLOCOCCI FROM FOODS

Hobbs, Betty C., Margaret Kendall, and R. J. Gilbert (Food Hygiene Laboratory, Central Public Health Laboratory, London, N.W.9, England)
Applied Microbiology 16, No. 3, 535 (March 1968)

Many media have been proposed for the isolation and enumeration of coagulase-positive staphylococci from foods. These media have been developed to select the coagulase-positive staphylococci without having to conduct confirmative coagulase tests. However, most of the available media require coagulase tests on single colonies for final confirmation.

Phenolphthalein diphosphate agar (PPA), which utilizes the phosphatase reaction of staphylococci, has been used by the authors for several years. Polymyxin is included in the medium to suppress the heterologous microflora that are associated with most foods. The authors report on the value of PPA with added polymyxin in the examination of foods for staphylococci.

Eight selective media for the detection and enumeration of coagulase-positive staphylococci were investigated for their efficiency in recovering six known food-poisoning strains of staphylococci from contaminated food. The PPA with polymyxin gave results comparable to those obtained with the other media tested. The desirable characteristics of PPA with polymyxin include the follow-

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POTENTIAL COMMERCIAL SCALLOP BEDS IN FLORIDA

SHRIMP EXPLORATION

ACTION OF MICROORGANISMS ON RANCID FAT

SELECTIVE MEDIUM FOR STAPHYLOCOCCI

1.85 (Cross Reference: 1.01113, 2.12)

Pandalopsis dispar, which occurred in small quantities on inshore grounds. Other shrimp caught were prawn, Pandalus platyceros, and negligible amounts of humpback shrimp, P. hypsinotus.

The most promising area found was the Pearl Rocks Grounds, a 14-square-mile area 5 miles south of Cape Calvert. Catches from tows made at 70 to 105 fathoms yielded between 80 and 630 mixed shrimp, of which 95 percent were smooth pink shrimp (134 shrimp to the pound) and 5 percent were sidestripe shrimp (33 shrimp to the pound). Another promising area was at the entrance to Quatsino Sound, 2 miles east-southeast of Kains Island. Catches from tows made at 74 to 95 fathoms averaged 335 pounds of mixed shrimp, of which 87 percent were pink shrimp (77 shrimp to the pound) and 13 percent were sidestripe shrimp (32 shrimp to the pound). Good quantities of smooth pink shrimp were caught on the north side of the "Stump Ranch," a commercial trawl area in Queen Charlotte Sound seaward of the Virgin Rocks. The tows yielded catches of 290, 175, and 240 lb. of smooth pink shrimp.

Several catches yielding over 10 lb. of prawns per tow were made in Nootka Sound. As the majority of commercially landed prawns are caught in traps, Nootka Sound is considered to be a good potential prawn trap-fishery area.

The authors emphasize that the catch results are only an indication of the shrimp available to the trawl during the period of the survey. The size of the catch in other seasons cannot be predicted. They do predict, however, that the average size of the shrimp will be larger in the fall and winter and that smaller counts per pound will prevail.

1.84 (Cross Reference: 1.0117)

scallop fishing, so, as a result, the company has been without calico scallops for periods of months because supplies from Florida were not available.

Interest in developing the Florida scallop industry is being spurred by exploratory surveys made by the Bureau of Commercial Fisheries. The Bureau has conducted a series of exploratory surveys to assess the potential for commercial utilization of calico scallops. Meat yields from the calico scallop have run as high as 6 and 7 pounds of meat per bushel of whole shellfish. The surveys disclosed that there are three separate beds of calico scallops off the east coast of Florida. Typical densities on the beds were found to be about four scallops per square foot; some densities exceeded eight scallops per sq. ft. Fisheries experts believe the beds can be year fished all year with production lasting indefinitely. Sample drags have produced catches of up to 32.2 bushels of scallops per 30-min. drag. Counts ranged from 72 to 106 meats to the pound, and yields averaged 5½ lb. of meat per bushel.

2.05

ing: (1) rapid growth of coagulase-positive staphylococci in 24 to 36 hours; (2) simple formula and ease of preparation; (3) stability for at least 2 weeks when stored at 4° C.; (4) color indicator for phosphatase activity when the plates are inverted over ammonia; and (5) economy. The authors found that this medium was particularly suitable for busy routine laboratories with limited funds and a shortage of technical assistance.

[Abstracter: M. F. Tripple]

[46 references]

thors discuss the implications of the findings.

ture range of growth; toxicity did not decrease in a synthetic medium. The author's concentrate decreased in a complex medium on prolonged incubation in the high-temperature decreased by ethanolamine, N-methylethanolamine, or betaine. A complex medium, but not in a synthetic medium. The toxicity of the culture filtrate could not be replaced by ethanolamine, N-methylethanolamine, or betaine. A toxigenic strain showed proteolytic, lipolytic, and lecithinase activity in a could replace choline in the chemically defined medium, and normal cell division and cell morphology of C. botulinum Type E would still occur. However, choline by repeated subculturing. Acetylcholine, N,N-dimethylethanolamine, and lecithin production by a representative strain of C. botulinum Type E was not influenced mal cell morphology in a synthetic medium containing choline. Growth and toxin botulinum Type E were tested, of which eight strains showed good growth and normal of Bacteriology 94, No. 6, 1924-1929 (December 1967)

Gullmar, B., and N. Molin (SIK, Göteborg, Sweden)

This report describes the influence of the chemical environment on some physiological properties of Clostridium botulinum Type E. Twelve strains of C. botulinum Type E were tested, of which eight strains showed good growth and normal cell morphology in a synthetic medium containing choline. Growth and toxin production by a representative strain of C. botulinum Type E was not influenced by repeated subculturing. Acetylcholine, N,N-dimethylethanolamine, and lecithin could replace choline in the chemically defined medium, and normal cell division and cell morphology of C. botulinum Type E would still occur. However, choline could not be replaced by ethanolamine, N-methylethanolamine, or betaine. A toxigenic strain showed proteolytic, lipolytic, and lecithinase activity in a complex medium, but not in a synthetic medium. The toxicity of the culture filtrate decreased in a complex medium on prolonged incubation in the high-temperature range of growth; toxicity did not decrease in a synthetic medium. The authors discuss the implications of the findings. [46 references]

[Abstracter: M. F. Tripple]

2.01

Pseudomonas fragi and Aspergillus flavus produced methyl ketones, which belong to a monocarbonyl class that does not appear in rancid lard. There appeared to be a relation between the ability of the microorganisms to strongly decompose peroxides and the ability to produce a great increase in the monocarbonyl content. There apparently was no relation between their ability to decompose peroxides and lipolytic activity.

The possible importance of microorganisms in controlling hydroperoxides and monocarbonyls in fats is discussed. The use of microorganisms to remove monocarbonyls and peroxides from rancid fat and to delay the onset of autoxidation in fresh fat is being investigated. No attempt was made in the present study to determine the similarity of activity between taxonomic groups; however, the activities of three species within the genus Pseudomonas were similar, as were the activities of two strains of Staphylococcus aureus and two strains of Bacillus cereus. [21 references]

2.03 OCCURRENCE AND ORIGIN OF TRIMETHYLAMINE OXIDE IN FISHES AND MARINE INVERTEBRATES

Yamada, Kinjiro

Bulletin of the Japanese Society of Scientific Fisheries 33, No. 6, 591-603 (June 1967) (In Japanese) (91 references)

1.8 CARBOHYDRATE METABOLISM IN MARINE MOLLUSKS

Simpson, John Wayne (Rice Univ., Houston, Texas)

Chemical Abstracts 64, 5513a (February 14, 1966)

2.1121 MOTORIZED TRAWL DOORS PERMIT PRECISE CONTROL OF NET DEPTH
(*)
Anonymous
National Fisherman 49, No. 2, 23A (May 1968)

At present, the best method of midwater trawling is to locate schools of fish by echo sounding and then try to adjust the net to the proper depth before the fish get away. The depth of the net is adjusted either by changing the speed of the towing vessel or by changing the length of the warps that lead from the vessel to the net. Now a Cambridge (Mass.) scientist has developed a net that can be sent quickly and accurately to the depth of the fish as indicated by the echo sounder.

The device has two hydrofoil doors mounted parallel to each other at each side of the net. The effect is a biplane configuration. The two wings of this biplane are connected by a rotating cylinder that is actuated by an internally mounted electric motor. The rotor action of the cylinder forces the doors into a dive or a climb, depending on which direction the cylinder is rotated. Although manual control of the rotors is planned, a fully automated system controlled by the echo sounder is a distinct possibility, the inventor promises.

The depth attained by a net equipped with the device is completely flexible--no change in towing speed or warp length is necessary. It will probably be used

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*Item on back of card.

 ABSTRACTER: L. Baldwin

2.1121 WING TRAWL MAY BE BOON TO SMALL DRAGGERS
(*)
Thomson, David B.
National Fisherman 49, No. 1, 10B, 14B (April 1968)

Since the otter trawl was developed some 100 years ago, it has undergone a continuing series of improvements--the use of cables between the boards and the wing ends to increase spread, the use of synthetic fibers for the nets, and changes in the design of the boards and of the nets. For the past 10 years, most of the European trawl fishermen who fish no farther out than 250 miles have been using a wing trawl developed by the Danish and Swedish fishermen. The nets are used in vessels that range from 50 to 80 feet in length and have engines of from 100 to 400 hp.

The wing trawl is a large, light net having longer wings than the ordinary trawl has and an exceedingly large mouth opening. It is quite effective for catching cod, whiting, haddock, and flounder. It can be adapted for catching herring either on or off the bottom. The Scots use it in fishing for Norway lobster, which is smaller than the ordinary lobster.

The wing trawl differs from the conventional trawl in that it is made of light twine, usually polyethylene or polypropylene; it has longer wings; it has a light grass or combination groundrope that may or may not carry a few light bobbins; and it has a V- or fishtail-type wing end with a selvage rope running

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*Item on back of card.

 ABSTRACTER: L. Baldwin

2.1128A HOW TO BUILD A SUCCESSFUL WIRE LOBSTER TRAP

Spurling, Ted S. (Isleford, Maine)
National Fisherman 48, No. 12, 11B (March 1968)

Attempts to design and build lobster traps from materials other than wood have been largely unsuccessful because of the traps' high cost and poor catchability. Now a Maine lobsterman has built a trap entirely of plastic-coated wire. The design is very similar to that of conventional wood traps, but the wire traps are less expensive (the material averages about $3.50 per trap), they are easier to haul (they weigh about one-third as much as wood traps), they stay in position during stormy weather better, they are easier and quicker to build and repair, and they fish just as well as the wooden traps do. Over a 5-year test period, the wire traps were set both mixed in with the wood traps and in straight gangs by themselves in the same area as the wood traps. Time after time, the catch of the wire traps averaged about the same as that of the wood traps. Their life expectancy proved to be about 4 years.

The lobsterman has built both scoot and side-parlor type wire traps. The side-parlor trap seems to be a little better, so he gives step-by-step instructions, with illustrations, for constructing it. The plastic wire used comes in 100-foot rolls either 12 or 18 inches wide. The meshes are 1 inch by 2 inches. For the sample trap, he used the 18-inch wire, so, unless otherwise specified, all widths are 18 inches.

(over)

 ABSTRACTER: L. Baldwin

2.1128B HOW TO BUILD A SUCCESSFUL WIRE LOBSTER TRAP
(*)
Spurling, Ted S. (Iselford, Maine)
National Fisherman 48, No. 12, 11B (March 1968)

and 4 inches wide; bend it into a hood. Attach the 4-inch ends to the sides of the ramp to form a tunnel through which the lobster can enter the fishing end of the trap. Make a similar fishing head in the other side section. On one side section, high above the fishing head, fasten two small laths back to back on each side of the wire. (These laths provide a place to hang the bait pocket and to fasten the door cleat.)

4. Door.--Cut a section of wire 3 feet long. Divide it into two parts, one 7 inches wide and the other 10 inches wide. (One inch will be lost from the regular 18-inch-wide wire.)

B. Assembling the sections

1. Attach the side-parlor partition (A.2) across the bottom (A.1) 14 inches from one of the bends that form the ends.

2. Fasten the two side sections (A.3) to the bottom sections, the ends of

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*Item on back of card.

 ABSTRACTER: L. Baldwin

MOTORIZED TRAWL DOORS

WING-TYPE OTTER TRAWL

BUILDING WIRE LOBSTER TRAPS

BUILDING WIRE LOBSTER TRAPS

2.1121

from the apex of the V to the shoulders of the net. This V-type wing end passes the strain that would normally be on the headline to the selvage. Thus the headline can rise higher than it can in the conventional trawl. Some wing trawls are made with four seams instead of two to allow for even greater headline height.

The author suggests that U.S. fishermen could use the wing trawl to advantage in the New England haddock fishery; in both the Atlantic and the Pacific flounder fishery; in the trash fishery, which seeks small high-swimming fish for reduction to fish meal; and in the fisheries devoted to catching butterfish, scup, lobster, or shrimp. The advantage is that it allows a relatively small dragger to use an appreciably larger net than the dragger otherwise could.

[Abstracter: L. Baldwin]

Many research workers in naval architectural engineering have adopted the transfer-function method of denoting steering characteristics of ships. These characteristics can be determined by measuring the transfer function as if the individual coefficients of the differential equation expressing the dynamics of the ship were not clear. Using the transfer-function method, the authors have measured the steering characteristics of the fisheries' training ship Hokusei Maru, whose steering characteristics have to be excellent to give the quickness and maneuverability required in the fishing grounds. The main results obtained from a series of zig-zag courses run at various helm and rudderhead angles are given in terms of dynamic stability, response, steering quality, and the effects of wind and wave force.

Sato, Teruo, and Noritatsu Sano
Bulletin of the Faculty of Fisheries, Hokkaido University 15, 169-180 (November 1964)

2.1 ON MEASUREMENTS OF TRANSFER FUNCTIONS RELATED TO THE FISHING TRAINING SHIP HOKUSEI MARU

2.1121

primarily in the midwater region between the surface and 100 fathoms; however, it should be extremely useful for trawling within a fathom or two of the bottom because its rapid action makes avoidance of any obstacles protruding from the ocean floor possible.

A small prototype of the device, which is being developed in cooperation with the U.S. Bureau of Commercial Fisheries, has been tested successfully. Work on the larger commercial model is continuing.

[Extractor: L. Baldwin]

A Norwegian firm has developed a two-component, epoxy-based paint that can be applied under water. In contrast with conventional ship's paint, which may be from 90 to 150 microns thick, the new paint must be put on in layers up to 3,000 microns thick. The frogmen who tested it agreed that the best way of putting it on is by hand. A handful of paint pressed against the hull will stick in about 20 seconds; the chemical characteristics of the paint force all water away from the hull and cause the paint to harden on the hull in 1 or 2 days' time. The paint must be used within 40 minutes after the two components have been mixed.

The developer's aim is not to outmode docking and full overhaul of ships, but to make repair of limited damages possible without the ship's having to be docked. Since the hull is most exposed just below the waterline, underwater painting in this area could probably be done largely without the help of frogmen.

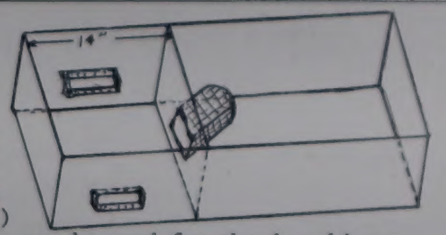
Export Council of Norway Information Service Leaflet, 4 pp. (September 1965)
World Fisheries Abstracts 16, No. 4, p. 1 (October-December 1965)

2.113 HOW TO PAINT UNDERWATER

2.1128B

the trap, and the ends of the side-parlor partition. (See figure.)

3. Place the 7-inch section of door (A.4) across the top, and fasten it to the sides, the ends, and the top of the side-parlor partition. Place the 10-inch section across the open area of the top; hinge the side that butts against the 7-inch section. (This is the door.) Pieces of the plastic wire, bent into a U shape, can be used for the door hinges and fastenings.



[Abstracter: L. Baldwin]

Using a tracer paste that is very similar in color to a commonly used outboard motor lubricant and a portable ultraviolet light that reveals the tracer on hands, clothing, or boat, the California Department of Fish and Game has taken a giant step toward eliminating lobster poaching. By applying the tracer to the pot, the rope that holds the pots in place, or even the lobsters themselves, poachers who set traps in closed areas or remove lobsters from another fisherman's pots can be detected and cited. One lobster fisherman who reports that he has lost at least one-third his catch over the past 15 years to raiding lobstermen or to skindivers says he is confident that the detection method will catch some poachers and discourage others.

Wimer, Arthur
National Fisherman 48, No. 12, 10B (March 1968)

2.1129 INVISIBLE LIGHT IN A LITTLE BLACK BOX TATTLES ON DIRTY-FINGERED POACHERS

2.1128A

A. Cutting and shaping the sections

1. Bottom and ends.--Cut a 5-foot length of wire. Bend this piece in toboggan fashion so that 12 inches at each end will be at right angles to the center section. (The 3-foot center section is the bottom; the end sections are the trap ends.) Secure a good-sized flat rock in the center of the bottom section by sandwiching it between the bottom and another piece of wire cut large enough to cover it completely. On one end, about 2 inches up from the bend, fasten two wood laths back to back on each side of the wire. These laths provide a stable place to attach the buoy line. Also, the trap number can be put on the inside lath.

2. Side-parlor partition.--Cut a section of wire 12 inches high. In the center of this section, 2 inches from the bottom edge, cut a hole 5 inches long by 4 inches wide. Cut another piece of wire 14 inches long by 8 inches wide; roll it into an 8-inch cylinder, push the cylinder into the 4- by 5-inch hole, and secure it. (This cylinder forms the parlor head. It can be bent to any angle desired.)

3. Sides.--Cut two pieces of wire 12 inches wide by 3 feet long. Take one of these pieces and measure from the end toward the center about 4 inches and from the bottom up 3 inches. Cut toward the top for 4 inches. Bend the uncut side so that a 4- by 6-inch crawl ramp is made. (See figure.) Cut a section of wire 14 inches long

(Continued on Card 2.1128B)

STEERING CHARACTERISTICS OF SHIPS

UNDERWATER PAINT

ANTIPOACHING HELP FOR LOBSTERMEN

2.1128 (*) SPECIAL SMALL-CLAM RETAINER AND BOTTOM SAMPLER DESIGNED

Fahlen, Lars A., and Phillip S. Parker (Exploratory Fishing and Gear Research Base, Bureau of Commercial Fisheries, Gloucester, Massachusetts 01930)
Commercial Fisheries Review 30, No. 2, 23 (February 1968) (Separate No. 807, U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 20240)

In a survey conducted to evaluate the availability of surf clams off New Jersey, Maryland, and Virginia, the personnel of the Bureau of Commercial Fisheries used an experimental dredge with a small-clam retainer. The retainer collects small surf clams, other bottom organisms, and materials that would otherwise pass through the peripheral slots of the dredge. The collecting unit can be fitted to any dredge that resembles the sea clam dredge.

The specially constructed retainer, or sampler, is a triangular-shaped box with steel rods across the entrance and a collecting bag on the back side. The entrance has ½-inch round steel welded horizontally 1½ inches apart. These rods allow small items that are washed out of the bottom and those that lie on the bottom to pass into the sampling unit. They prevent large materials from passing into the unit; these materials are retained in the chain bag.

The collecting bag is attached to an 8-inch-square frame of ½- by 1½-inch angle iron. The size of the netting in the sampling bag controls the size of

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*Item on back of card.

 ABSTRACTER: M. F. Tripple

2.117 COLVIN TRIES FERRO-CEMENT; DESCRIBES RESULTS

Colvin, Thomas E. (Miles, Virginia)
National Fisheries 48, No. 11, 6B (February 1968)

A professional builder makes several observations about constructing boats of ferro-cement.

1. The materials for construction, though somewhat cheaper than other materials, are not as cheap as some proponents of the method have advocated. However, the saving in labor can be quite large.

2. Detailed thought must go into the layout of the vessel, since such features as the engine beds, fuel tank foundations, and stern tube aperture must be carefully planned if alignment is to be ensured in the completed vessel. In other words, the method is not the "slap together" procedure some builders imply.

3. Bending the pipe for the frame is not as easy as it may sound. If a perfect flatness from side to side is to be maintained, the pipe cannot twist even a little bit. Setting up the frame still requires all the care that would be taken in constructing a steel or wooden vessel.

4. The keel of any except the smallest craft sh be primarily of steel and strongly reinforced.

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 ABSTRACTER: L. Baldwin

4.21 (*) THE EFFECTIVENESS OF A LIPID PEROXIDE IN OXIDIZING PROTEIN AND NON-PROTEIN THIOLS

Little, C. (Department of Biochemistry, Norsk Hydro's Institute for Cancer Research, The Norwegian Radium Hospital, Montebello, Oslo 3, Norway), and P. J. O'Brien (Department of Medical Pharmacology, University of Birmingham, England)
Biochemical Journal 106, No. 2, 419-423 (January 1968)

The authors investigated the effectiveness of a lipid peroxide in causing thiol oxidation in several hemoproteins, nonheme proteins, and small thiols. The authors used a very pure preparation of lipid peroxide, rather than the system of peroxidizing lipid used by previous workers. The effect of pH on the reaction was also investigated. The results showed that, apart from the hematin ring, the thiol group is probably the site in proteins that is most sensitive to modification by lipid peroxides. It also seemed that at low concentrations, the surface-active properties of a lipid peroxide did not facilitate the oxidation of sterically sheltered thiol groups in proteins. The authors felt it was probable that hydrophobic bonding of the fatty acid moiety of a lipid peroxide to the protein impeded thiol oxidation.

Thiol oxidation by a lipid peroxide or by hydrogen peroxide was as efficient in denatured nonheme proteins as it was in small thiols. Both peroxides were relatively ineffective in oxidizing hemoprotein thiols, particularly at low pH. Increased amounts of hematin greatly decreased the efficiency of the oxidation of

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 ABSTRACTER: M. F. Tripple

5.41 (*) STUDIES ON THE PRODUCTION OF B VITAMINS BY INTESTINAL BACTERIA OF FISH. III - ISOLATION OF VITAMIN B_{12} SYNTHESIZING BACTERIA AND THEIR BACTERIOLOGICAL PROPERTIES

Teshima, Shin-ichi, and Ken-ichi Kashiwada (Faculty of Fisheries, Kagoshima Univ., Shimoaratacho, Kagoshima, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 10, 979-983 (October 1967)

In previous work, the authors studied the ability of intestinal bacteria of carp to produce B vitamins; in the present work, they report on the ability of intestinal bacteria to synthesize vitamin B_{12}.

Of the 198 strains of bacteria isolated from the intestinal canal of carp, none destroyed B_{12}; 48 percent had a medium to strong ability to produce B_{12}; 52 percent had a weak to neutral ability. Of the 31 strains showing a strong ability to produce the vitamin, 27 strains were gram-negative and 4 were gram-positive; 5 had a noticeably high synthesizing capacity.

The number of rod-shaped organisms in the strains that were isolated exceeded the number of spherical organisms; however, the ratio of rod-shaped organisms to spherical organisms was approximately equal in all strains.

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*Items on back of card.

 ABSTRACTER: L. Baldwin

SMALL CLAM RETAINER AND BOTTOM SAMPLER

FERRO-CEMENT CONSTRUCTION

THIOL OXIDATION BY A LIPID PEROXIDE

ABILITY OF BACTERIA TO SYNTHESIZE B_{12}

2.117

5. The insistence by some builders that large flat sections are a liability is not valid. The framing system for such surfaces should be longitudinal rather than transverse; thus it can be closely related to the longitudinal-framing system used for merchant vessels. In these vessels, the transverse frames are widely spaced and the longitudinal ones closely spaced. The rerods, then, would be run transversely and the mesh tied accordingly.

6. The wiring is critical. In larger vessels, hardware cloth can be used, but in smaller vessels, 20-gage hardware cloth is too stiff. However, reducing the steel content to permit easier working reduces the overall strength of the vessel.

7. Reinforcing rods are more easily welded (electrically, not by acetylene, of course) than wired to the pipe frames.

8. Bulkheads of ferro-cement should be almost as thick as the hull. Because of the large flat surfaces involved, they are harder to frame up and hold straight. (Corrugations might be a solution to this problem.)

He also draws some conclusions about the advantages of ferro-cement construction.

1. The material is very stable, readily obtainable, and has a life expectancy that exceeds that of most other materials.

2. The method permits an amateur builder to spread his initial investment over a greater period of time without having to worry about deterioration of the hull itself. It lends itself to any form of bottom while imposing no limits on the final size of the vessel. It permits almost any kind of wood or steel vessel to be converted directly--or almost directly--into ferro-cement.

Included in the article is a standard drawing illustrating some 2 dozen detailed sections of the ferro-cement design being used by builders of a 52-foot cargo schooner and a 42-foot pinky schooner, among others.

2.1128 (Cross Reference: 2.12)

the material collected. The frame and the bag are readily accessible through a hinged door on the side of the sled cage.

The sampler is attached to the inner right side of the sled cage and is positioned so that its collecting bag is well forward of the chain at the rear of the cage. Because the retainer is attached to the dredge, small surf clams and small-sized materials are taken when the experimental dredge is used during normal fishing operations.

5.41

The five strains that had especially high synthesizing ability were incubated, along with five culture-media controls, for 24 hours at 30° C. During this time, the vitamin B12 content of the bacterial cells and the culture media did not increase equivalently. B12 reached a peak in all the culture media within the first 12 hours and then decreased with varying degrees of abruptness during the last 12. In contrast, the vitamin B12 content in the bacterial cells continued to increase throughout the incubation period. With one exception, the increase was almost linear, and in two of the strains, no leveling off was noticeable after 24 hours' incubation. [11 references]

4.21 CHROMATOGRAPHIC SEPARATION OF LIPIDS OXIDIZED IN THE PRESENCE OF PROTEINS

Pokorny, Jan, and Eva Davidkova (Vysoka Skola Chem.-Technol., Prague, Czechoslovakia)
Chemical Abstracts 67, No. 7, 29752r (August 14, 1967)

4.21 OXIDATION OF LIPIDS OF FREEZE-DRIED FOODS DURING STORAGE. I - EFFECT OF POROSITY OF FREEZE-DRIED FOODS ON THE OXIDATION OF LIPIDS

Ohata, Suaumu, Akira Hiyoshi, Akira Wakaizumi, Takayasu Asari, and Kinshi Suminoe (Tokyo Agr. Univ., Tokyo, Japan)
Chemical Abstracts 68, No. 7, 28564q (February 12, 1968)

5.41 BIOSYNTHESIS, ABSORPTION, AND ACCUMULATION OF VITAMIN B12 IN GROWING PIGS FED DIFFERENT FEEDS

Grzeszczak-Swietlikowska, Urszula, (Katedra Zywienia Zwierzat, Szkola Glowna, Gospodarstwa Wiejskiego, Warsaw, Poland)
Chemical Abstracts 65, No. 13, 20580a (December 19, 1966)

5.110 (Cross Reference: 8.610)

RETINOL IN EGGS, BLOOD, AND LIVER

Black, P. A. (Natl. Inst. Res. Dairying, Shinfield, England)
Chemical Abstracts 63, 3365d (August 2, 1965)

4.21

GSH (reduced, oxidized glutathione) by peroxides, particularly at low pH. Other than the hematin ring, the thiol group was found to be the group in proteins that was probably the most sensitive to modification by peroxides. At low concentrations, the fatty acid moiety of a lipid peroxide appeared to impede thiol oxidation in proteins by hydrophobic bonding to the protein. The fatty acid moiety did not stimulate thiol oxidation by denaturing the protein, which would have increased the exposure and reactivity of the thiol group. The relative rates of thiol oxidation by peroxides in the different thiols were as follows: hemoprotein thiols>small thiols>other protein thiols. In all cases, thiol oxidation by the lipid peroxide was much more rapid than oxidation by hydrogen peroxide. [24 references]

2.12 LONG-TERM ACTIVITY RECORDING IN SMALL AQUATIC ANIMALS

Heusner, A. A. (Center for Health Sciences, University of California, Los Angeles), and J. T. Enright (Department of Zoology, University of California, Los Angeles)
Science 154, No. 3748, 532-533 (October 28, 1966)

An activity-recording device has been built that is based on the principle of detecting slight changes in the heat conductance of an aquatic environment by means of a thermistor. An advantage of the device is that it can be used with a simple event recorder, thereby combining high sensitivity with low cost. The equipment has been tested with automatic mechanical stimulation. It has also been used for long-term recording of the swimming of small marine crustaceans. The problems of stability and reliability have been solved. The potential applications of the device appear to be promising. [Abstracter: M. F. Tripple]

SYNTHESIS AND STORAGE OF VITAMIN B12 IN FIGS
RETINOL IN MARINE TELEOSTS
SEPARATING LIPIDS OXIDIZED IN A PROTEIN MIXTURE
OXIDATION OF LIPIDS IN FREEZE-DRIED FISH

ACTIVITY RECORDED IN AQUATIC ANIMALS

6.193 STUDIES ON FISH SOLUBLES.
IV - EFFECT OF UNIDENTIFIED GROWTH FACTOR
IN FISH SOLUBLES ON GROWTH OF RAT (2)

Yanase, Masaaki, and Kimie Arai (Tokai Reg. Fish. Res. Lab., Kachidoki, Chuō-ku, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 11, 1057-1063 November 1967) (In Japanese; summary and tables in English)

Two feeding trials on rats were conducted to show the possible presence of an unidentified growth factor in fish solubles or in whole fish meal.

In the first test, four groups of weanling rats (three males and four females to a group) were pair-fed for 6 weeks. The control group was fed a basal diet containing 15 percent of casein, 40 percent of starch, 32 percent of sucrose, 5 percent of soybean oil, 4 percent of a salt mixture, 3 percent of cellulose flour, and amounts of less than 1 percent of a vitamin mixture, dl-methionine, and choline chloride. In the three test diets, 2.25 percent of the casein was replaced isonitrogenously by meal made of the whole meat of jack mackerel, whole liver meal of bluefin tuna, or liver solubles of bluefin tuna. The results showed that the fish materials improved the protein efficiency of the females during the final 3 weeks of the test. The effect of the fish materials on the males was not observed during the entire feeding period.

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 ABSTRACTER: L. Baldwin

6.55 STUDY SHOWS FISH FLOUR CAN BE USED IN MILK REPLACERS
(*)
Anonymous
Feedstuffs 40, No. 16, 56 (April 20, 1968)

Part of the milk protein used in some calf diets can be replaced by dried, defatted, whole fish protein concentrate. It is similar to dried milk in price and in protein content, and, now that processors are removing most of the fish oils, it is bland in taste and keeps well.

Four experimental milk replacers were prepared (see table below) and fed to four groups of calves aged from 2 to 3 days and four groups aged from 10 to 27 days.

In the first experiment, 2- and 3-day-old calves were used. These animals developed severe diarrhea and had to be removed from the

Ingredients	Diet 1	Diet 2	Diet 3	Diet 4
	percent of total diet			
Dried whole cheddar cheese whey	24.8	0	0	0
Lactose (milk sugar)	0	12.3	14.8	23.3
Choice white pork grease	18.0	18.0	18.0	18.0
Dried skim milk powder	47.0	64.5	57.0	43.5
Defatted fish protein concentrate	10.0	5.0	10.0	15.0
Vitamin mix (10,000 I.U. of A, 3,500 I.V. of D_3)	0.2	0.2	0.2	0.2

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 ABSTRACTER. L. Baldwin

6.54 HIGH-PROTEIN FOODS--FILLING THE QUALITY GAP
(*)
Anonymous
Chemical Engineering 74, No. 26, 96, 98, 100 (December 4, 1967)

In the opinion of experts in the field, the population explosion has triggered the potential of world famine. Statements such as "famine can be expected to emerge as the paramount force in the world socio-politico economy by 1975" add emphasis to the prediction. A report issued by the United Nations stated that "While the quantity of food (calories) is already causing considerable concern in many areas throughout the developing world, the quality (notably protein) of the food consumption pattern is even more critical."

An adult male needs 14 percent protein in his food, while even higher percentages are needed by growing children and nursing mothers. Increasing the supply of carbohydrate-based foods, which are the basic diet items in many of the developing countries, will not fill the nutrition needs. Many of the programs proposed to avert the predicted famine include intensive research into ultimate sources of protein foods. Strenuous efforts are currently under way to minimize the problem of protein malnutrition by developing inexpensive foods with high-protein content. These foods would be made from sources such as soybeans, cottonseed, hydrocarbons, and fish.

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 ABSTRACTER: M. F. Tripple

6.83 FISHERY PRODUCTS OF COMMERCE -- FISH MAWS
(*)
Anonymous
Fish Technology Newsletter 5, No. 2 (July 1964)
Indian Fisheries Bulletin 11, No. 4, 17-18 (October 1964)

The value of dried fish maws exported from India has been averaging 2,000,000 rupees (about $420,000) a year. Most of the maws are exported to Asian countries bordered by the Pacific, to New Zealand, and to the United Kingdom. In the British-held countries, the gelatin that is the principal constituent of the fish maws is used principally for clarifying wines; in China, the inferior maws are used for making soups. Since the price of the product can be increased by improving its quality, methods of ensuring good quality are suggested.

"Maws," as used here, refers to the air or swim bladders of the fish. Maws from fresh-water fish are more transparent than are those from marine fish. A good quality fish maw, when fresh, is white, thin, semitransparent, and tough. Those that are yellowish or have black spots bring lower prices. Yellowish maws can be improved by soaking them in warm water for 4 or 5 hours, removing the membranes and blood vessels by hand, pressing the resultant product, and drying it.

Three methods of preparing fish maws are presently being used in India.

1. The maw is washed in whatever water is available, whether fresh or salt, and then dried in the sun till it is completely dry and bone hard.

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 ABSTRACTER: L. Baldwin

EFFECT OF FISH MATERIAL ON PROTEIN EFFICIENCY RATIO IN RATS

HIGH PROTEIN FOODS FROM FISH

FISH FLOUR AS A MILK REPLACER FOR CALVES

IMPROVING THE QUALITY OF SOUNDS

6.54

In the author's opinion, perhaps the most aesthetically unappealing of all these potential sources of high-protein foods is fish protein concentrate (FPC). He states that the use of FPC for direct human consumption raises particular problems of taste and odor. Basically, the product consists of solid parts of fish with most of the fats and water removed. The resulting product, as now produced commercially, is chiefly used as an additive to animal and poultry feed. A great deal of effort has been expended to develop solvent extraction processes to remove water, fats, and oils to make a marine protein concentrate that could be an acceptable product for human consumption. A pilot plant for FPC production, built for the Bureau of Commercial Fisheries, has been in operation for some time. Secretary of the Interior Stewart Udall described FPC "as a lifeline to the future of the world's hungry millions."

After a review of the problem, the author concludes that "There are no panaceas or easy answers to the worldwide food shortage...."

6.54 THE UTILIZATION OF FISH WASTE

Netherlands Appl. 6,614,977
Chemical Abstracts 67, No. 13, 6311Oq (September 25, 1967)

6.54 PROCESSING OF FAT CONTAINING ORGANIC SUBSTANCES

Netherlands Appl. 6,609,272
Chemical Abstracts 67, No. 1, 2278d (July 3, 1967)

6.193

In the second test, one group of rats was fed the basal diet and compared with a group whose diet contained 3.3 percent saury solubles as the protein supplement. Another group was fed a basal diet that contained 8 percent casein and 47 percent α-starch and compared with a group that was fed a diet containing 6.8 percent casein, 1.76 percent saury solubles, and 47 percent α-starch. At the 15 percent protein level, the fish solubles had no effect on the growth of rats of either sex, despite the fact that the diet prevented coprophagy. At the 8-percent protein level, however, the fish solubles improved the protein efficiency ratio throughout the test period by 12 percent.

V - Effect of unidentified growth factor in fish solubles on growth of rat (3).--Ibid. 1064-1067. In continuation of the tests to determine the beneficial effect of fish materials on the protein efficiency ratio (PER) of rats, the authors conducted two additional feeding experiments. The basal diet used was the same as that in which purified casein constituted 8 percent of the total ingredients; the rats were all females.

In the first experiment, one test group received 8.09 percent of crude casein instead of 8 percent of purified casein, and one group, instead of pure casein, received 6.8 percent and 1.8 percent of fish solubles made from jack mackerel. In the second experiment, all the test groups received 6.8 percent of casein, but one group received an additional 1.9 percent of fish solubles made from jack mackerel; one group, an additional 1.75 percent of fish solubles made from saury; one group, an additional 2.19 percent of fish solubles made from Alaska pollack; and one group, an additional 1.75 percent of meat solubles made from skipjack.

All the fish solubles tended to benefit growth and improve the PER during the latter part of the experiment. The solubles of Alaska pollack were particularly effective; they gave a PER of 123 relative to that of the basal ration's 100.

6.83 (Cross Reference: 1.01512)

2. The maw is cut open, divested of the internal membranes, thoroughly washed in fresh water till free from all traces of blood and membrane, and beaten against a piece of wood till it is quite flat. The flattened pieces are then dried in the sun till they are bone hard.

3. The maw is pulled into shreds by hand, dusted with lime, and dried in the sun.

Dried maws are sometimes called isinglass, a product made from the maws.

6.83 CLARIFICATION OF BRANDY WITH GELATIN, FISH GLUE, AND BENTONITE

Semenenko, N. T.
Chemical Abstracts 63, 3581b (August 2, 1965)

6.82 OYSTER SHELL FED AS CATTLE 'ROUGHAGE'

Anonymous
Feedstuffs 37, 1, 78-79 (December 11, 1965)

Preliminary feedlot experiments indicate that oyster shell can be fed successfully to beef animals as a total or partial replacement for conventional types of roughage. Most or all the shells used in complete rations for feedlot cattle pass through the animal without being digested. The preliminary evidence indicates that a level of ¾ pound per head per day is adequate for complete roughage requirements.

[Abstracter: M. F. Tripple]

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diets. The experimenters concluded that calves younger than 2 weeks of age should not be fed diets containing fish protein concentrate.

In the main experiment, Holstein calves that were from 10 to 27 days old when the experiment began were used. These calves were fed daily 1 pound of the dry, experimental milk replacer mixed with 6 pounds of water for every 100 pounds of body weight. The gains were about what would be expected in calves fed ordinary milk replacers. The feed efficiency was also normal. Calves fed Diet 2 suffered diarrhea least. The experimenter concluded that substituting defatted fish protein concentrate for dried skim milk is not worthwhile unless the milk becomes much more expensive than the fish protein concentrate.

6.55 A PROTEIN FOOD FROM WASTES

French Patent 1,439,936
Chemical Abstracts 66, No. 7, 2787Gq (February 13, 1967)

6.53 ANIMAL FOOD FROM WASTE LIQUORS CONTAINING PROTEINS

Belgium Patent 656,401
Chemical Abstracts 65, 2917a (July 18, 1966)

PROTEIN FROM FAT-CONTAINING SUBSTANCES (NETH. PAT. APPL. 6,609,272)
UTILIZATION OF FISH WASTE AS FOOD (NETH. PAT. APPL. 6,614,977)

OYSTER SHELL AS CATTLE ROUGHAGE
CLARIFICATION OF BRANDY WITH FISH GLUE
ANIMAL FOOD FROM FISH-WASTE LIQUORS (BELG. PAT. 656,401)
CATTLE FOOD FROM FISHERY WASTES (FR. PAT. 1,439,936)

7.0 PHYSICO-CHEMICAL MEASUREMENTS BY GAS CHROMATOGRAPHY

Kobayashi, Riki, Patsy S. Chappelear, and Harry A. Deans (Department of Chemical Engineering, Rice University, Houston, Texas)
Industrial and Engineering Chemistry 59, No. 10, 63-82 (October 1967)

Gas chromatography is an analytical tool and a powerful and accurate method for measuring many thermodynamic properties, such as activity coefficients, heats of vaporization, solution and adsorption, and K-values. This paper reviews various aspects of the development and application of gas chromatography for the direct study of the following subjects:

I - Gas-liquid chromatography without chemical reaction.--Paper chromatography and liquid-liquid chromatography predate gas chromatography by several years and are credited with having provided the phenomenological and theoretical impetus for the development of gas chromatography. A chronological review of gas-liquid partition chromatography (GLPC) is included in this section.

II - Gas-liquid interfacial effects.--Under certain conditions, two types of adsorptive effects may operate during the measurement of physicochemical measurements by GLPC in a quantitative manner. The conditions and degree to which these effects might be relevant to the particular separation or measurement being conducted have been studied by several investigators.

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 ABSTRACTER: M. F. Tripple

7.591 (*) α-MANNOSIDASE AND β-MANNOSIDASE FROM THE LIVER OF TURBO CORTUNUS: PURIFICATION, PROPERTIES AND APPLICATION IN CARBOHYDRATE RESEARCH

Muramatsu, Takashi, and Fujio Egami (Department of Biophysics and Biochemistry, Faculty of Science, University of Tokyo, Tokyo, Japan)
Journal of Biochemistry 62, No. 6, 700-709 (December 1967)

In previous papers, T. Marumatsu (1966, 1967) reported that α-mannosidase (EC 3.2.1.24) purified from the liver of Charonialampas released mannose from ovalbumin glycopeptide. From this result, it was expected that several glycosidases of marine gastropods would be valuable tools for carbohydrate research. Thus, systematic fractionation of glycosidases from the liver of the sea snail, Turbo cortunus, was initiated. This paper describes the purification and properties of α-mannosidase and β-mannosidase (EC 3.2.1.25) from the liver of T. cortunus. The actions of purified mannosidases on some natural substrates are also described. The anomeric form of the mannosidic linkage involved in Taka-amylase A (EC 3.2.1) and O-antigenic lipopolysaccharide of Salmonella typhimurium is discussed.

The liver of T. cortunus contained several glycosidase activities. Column chromatography, heating, and hydroxylapatite column chromatography were effective in separating the glycosidases from each other. The α-mannosidase from the liver was purified 130-fold, using p-nitrophenyl α-D-mannoside as the substrate. The purified α-mannosidase was practically free from all the other glycosidases tested. This purified enzyme released 64 to 66 percent of the mannose from

*Items on back of card.

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 ABSTRACTER: M. F. Tripple

7.45 A SEQUENTIAL SCHEME FOR THE DETERMINATION OF SEVERAL FALL-OUT NUCLIDES IN WATER

Bathie, F. M., and B. A. Burden (Ministry of Technology, Laboratory of the Government Chemist, Cornwall House, Stamford Street, London, S.E.1, England)
The Analyst 93, No. 1102, 1-12 (January 1968)

A sequential separation scheme for the fall-out nuclides of ruthenium, molybdenum, tellurium, tin, and antimony in water is described.

Ten liters of water containing carriers for the five elements are treated with sodium hypochlorite solution to oxidize the ruthenium and to ensure exchange between carrier and fall-out activity. Ruthenium is oxidized to perruthenate ion, which is reduced to ruthenium by addition of ethanol. After boiling the slightly alkaline solution, the flocculent hydroxide precipitates and settles out fairly rapidly, allowing the clear supernatant liquid to be siphoned off. With hard waters, some water solids will also be deposited at this stage and may carry down some of the tellurium, antimony, and tin. The precipitate will also contain any insoluble matter present in the sample. This insoluble matter is rendered soluble by fusion with alkali, separated from the ruthenium, and returned to the main solution before the separation of the four remaining elements. The fusion converts the ruthenium to sodium ruthenate, which is easily reduced to the insoluble hydroxide. Ruthenium thus appears in both the aqueous and acidic extracts of the fused melt and is precipitated from both. Reduction to ruthenium metal with magnesium and acid effectively separates the ruthenium from tin and antimony.

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 ABSTRACTER: M. F. Tripple

7.593 NUCLEOTIDE DEGRADATION AND ORGANOLEPTIC QUALITY IN FRESH AND THAWED MACKEREL MUSCLE HELD AT AND ABOVE ICE TEMPERATURE

Fraser, Doris I., (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia), Dianne P. Pitts, and W. J. Dyer
Journal of the Fisheries Research Board of Canada 25, No. 2, 239-253 (February 1968)

There is very little information available on the rate and extent of nucleotide and nucleoside degradation in the Atlantic mackerel (Scomber scombrus) and the possible association of this degradation with undesirable flavors and with quality in this important food fish. Nucleotide degradation at temperatures above 0° C. appears to have received little attention. The effect on nucleotide catabolism of the adverse handling conditions (delay in icing, prolonged exposure to high ambient temperatures, freezing, and thawing) to which fish may be subjected during normal commercial practices of handling and marketing has also received little attention. The authors investigated these factors in mackerel to obtain a general picture of nucleotide degradation in relation to eating quality. The antioxidant, ascorbic acid, was used in some experiments because it might prevent or delay development of rancidity, and thus mask taste changes related to nucleotide changes. The red muscle of mackerel was also investigated because it comprises 11 to 27 percent of the edible weight and because in the swordfish the sequence of nucleotide changes occur much earlier in the red than in the white muscle.

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 ABSTRACTER: M. F. Tripple

REVIEW OF GAS CHROMATOGRAPHY

DETERMINATION OF FALL-OUT NUCLIDES IN WATER

ENZYMES FROM THE LIVER OF SEA SNAIL

NUCLEOTIDE DEGRADATION IN FRESH AND THAWED MACKEREL MUSCLE

7.45

Any associated tellurium is separated in the next stage when ruthenium tetroxide is extracted with carbon tetrachloride. The ruthenium is finally precipitated as the metal and magnesium and acid for chemical-yield determination and counting.

The remaining four elements are separated after evaporating the acidified sample to a few hundred milliliters. Molybdenum is precipitated first with benzoin α-oxime and is centrifuged along with some water solids deposited during the evaporation. The insoluble material, which may contain some tin and antimony deposited during the evaporation, is rendered soluble by fusion with alkali. After separation of molybdenum, the insoluble material is added to the main tin and antimony fraction. The molybdenum is reprecipitated with benzoin α-oxime, redissolved, and decontaminated by iron(III) hydroxide scavengers. Molybdenum is finally precipitated with 8-hydroxyquinoline for counting and chemical-yield determination.

Tellurium is precipitated next by reduction to the metal with hydrazine and sulfur dioxide.

Tin and antimony are precipitated together as sulfides and are decontaminated by two tellurium metal and two lead sulfide scavengers. These two elements are separated by extracting the antimony into 2-ethylhexan-1-ol and light petroleum from concentrated hydrochloric acid. Contamination of the antimony by tin is reduced by washing the solvent phase repeatedly with hydrochloric acid. The antimony is finally precipitated with 8-hydroxyquinoline for determination and counting. Tin is further purified by extraction into isobutyl methyl ketone. It is finally precipitated with cupferron and ignited to tin(VI) oxide, in which form it is weighed and counted. [15 references]

7.593

By the time of initial sampling of the mackerel, the adenine nucleotides had been deaminated to inosine monophosphate (IMP) in the white muscle; in the red muscle, high initial levels of inosine indicated that the degradative sequence was even more advanced. The postmortem rates of degradation of IMP to hypoxanthine through inosine were similar in both types of muscle. At the temperature of ice, the rates of degradation in mackerel were slower than in cod but faster than in swordfish. A 6- to 8-hour delay in icing after catching accelerated the gradual decline in eating quality, and the characteristic flavor of fresh mackerel was replaced by tastelessness. Dephosphorylation of IMP paralleled development of tastelessness, and organoleptic spoilage developed prior to accumulation of appreciable amounts of hypoxanthine. At temperatures of 5° to 20° C., rates of dephosphorylation of IMP, accumulation of hypoxanthine, and loss of quality were markedly increased. Thawing did not influence subsequent rates of deterioration; however, dips in ascorbic acid delayed darkening of the flesh in thawed samples.

Excellent correlation was obtained between taste and content of IMP and hypoxanthine, and between taste and dephosphorylation of IMP, under the various handling conditions. The handling conditions investigated included delayed icing, holding at elevated temperatures, and thawing. The tests used to measure dephosphorylation were ultraviolet absorption at 248 mμ of a Dowex-treated perchloric acid extract, and ratio of ultraviolet absorption of extracts at 251 mμ before and after Dowex treatment. These tests proved to be as good for indicating progressive quality loss to the unacceptable level as the more complex estimation of IMP or hypoxanthine. [27 references]

7.0

III - Relation of gas-liquid chromatography to extractive distillation and absorption.--The present state of development of GLPC allows direct relation of vapor-liquid equilibrium data obtained by GLPC to extractive distillation and absorption processes in which the extractive or absorptive agents have a low or negligible volatility under process conditions. Generalization of GLPC allows relation of GLPC measurements to essentially all processes that make use of vapor-liquid equilibrium information.

IV - Gas-solid chromatography without chemical reaction.--Although the authors are mainly concerned with gas-solid elution chromatography, they review in chronological order other forms of gas-solid chromatography either for historical reasons or for useful techniques in the study of physicochemical phenomena.

V - Chromatographic systems with chemical reactions.--The effect of reaction between species in a carrier or reactions with the stationary phase has been studied by a number of authors, many of which studies are mentioned in this section.

VI - Direct measurement of transport coefficients.--The realization that diffusion and transfer processes effect chromatographic peaks is well known and well documented.

VII - Surface area and catalyst studies.--A convenient and accurate method for the determination of surface areas of solids by a continuous flow technique has been extended to improve the accuracy and range of its applicability to solids with surface areas as low as 0.005 sq. m. per gram. Additional applications and methods are reviewed.

The use of gas chromatography for the measurement of physical variables to obtain thermodynamic data is well documented in this review, which contains a lengthy list of references. [196 references]

7.591

ovalbumin glycopeptide. It also released mannose from the pronase digest of Taka-amylase A and a mannosyl rhamnose, which is a part of the repeating oligosaccharide unit of the O-antigenic lipopolysaccharide in S. typhimurium. The α-mannosidase did not attack the yeast mannan.

The β-mannosidase from the liver of T. cortunus was purified 63-fold, using phenyl β-D-mannoside as the substrate. The purified β-mannosidase was practically free from all the other glycosidases tested. The purified enzyme hydrolyzed none of the four compounds tested with α-mannose. [23 references]

7.591 CYTOCHEMICAL LOCALIZATION OF TWO GLYCOLYTIC DEHYDROGENASES IN WHITE SKELETAL MUSCLE

Fahmi, H. Dartush, and Morris J. Karnovsky (Boston City Hospital, Boston, Mass.)
Chemical Abstracts 65, No. 1, 958c (July 4, 1966)

7.591 STUDIES ON THE TASTE SUBSTANCES IN FOODS.
IV - PURIFICATION AND PROPERTIES OF AN ALKALINE PHOSPHATASE IN CARP MUSCLE

Yamamoto, Yoshio, Yoko Kadowaki, Kinji Endo, and Hideko Kishida
Chemical Abstracts 68, No. 1, 206ly (January 1, 1968)

7.80 (*) MOLECULAR SHAPE AND ODOUR: PATTERN ANALYSIS BY PAPA [PROBABILISTIC AUTOMATIC PATTERN ANALYSER]

Amoore, J. E. (Western Regional Research Laboratory, ARS, U.S. Department of Agriculture, Albany, California); and G. Palmieri and E. Wanke (Istituto di Fisica, Università degli Studi, Genoa, Italy)
Nature 216, No. 5120, 1084-1087 (December 16, 1967)

Evidence exists that the specificity of the sense of smell depends largely on the molecular shapes of odorous compounds. Molecular silhouettes can be scanned and computed automatically by the Probabilistic Automatic Pattern Analyzer (PAPA) pattern recognition machine evolved and described by Palmieri et al. (1960, '61, '62, '63). The PAPA pattern recognition machine, consisting of an image dissector and computer, can scan the molecular silhouette with a reproducible collection of 4,096 random lines. Many of these lines will intersect the silhouette; this may be called the "PAPA intersection method." The intersection method can express the similarity in molecular shape between a test compound and the chosen standard. The authors found that 1,600 comparisons of molecular silhouettes, which had taken about 3 months by hand, could be accurately accomplished by the PAPA machine in 3 hours.

The authors applied the PAPA pattern recognition machine to the molecular morphology of the odor of chemicals only. However, they assumed that similar principles would also apply to other chemical-constitution or biological-activity

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8.59 (*) BIOSYNTHESIS OF ALDOSTERONE AND 18-HYDROXYCORTICOSTERONE FROM CORTICOSTERONE BY INTERRENAL TISSUE OF A TELEOST (CLUPEA HARENGUS HARENGUS)

Truscott, B., and D. R. Idler (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 25, No. 2, 431-435 (February 1968)

The presence of aldosterone as a product of the interrenal tissue of teleosts has been questioned for years. Two publications (Mayer et al., 1967; and Bern, 1967) have suggested that aldosterone does not appear to be a hormone of marine vertebrates; rather it is a development of the terrestrial vertebrate. Several careful and well-controlled experiments, along with the demonstration by Mayer et al. (1967) that cortisol has mineralocorticoid activity in the eel, have cast doubt upon the presence of aldosterone in teleosts. Therefore, the authors report on the unexpected results of an experiment originally planned to determine the distribution of the corticosteroid 1α-hydroxylating system found in elasmobranchs.

Chromatographic examination of the radioactive steroids produced by interrenal tissue of the Atlantic herring (Clupea harengus harengus) did not indicate the presence of 1α-hydroxycorticosterone; however, the results did suggest that aldosterone and 18-hydroxycorticosterone had been formed. The experiment

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8.51 (*) CHARACTERISTICS OF HEMOLYMPHS OF CANCER IRRORATUS, C. BOREALIS, AND HYAS COARCTATUS

Stewart, James E., and J. R. Dingle (Fisheries Research Board of Canada Halifax Laboratory, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 25, No. 3, 607-610 (March 1968)

The lobster pathogen Gaffkya homari grows as well in the hemolymph serum from the crabs Cancer irroratus, C. borealis, or Hyas coarctatus as it does in the hemolymph serum from the lobster Homarus americanus. When C. irroratus was challenged by G. homari, the microorganism was found to be mildly pathogenic for this species of crab. The authors compared some of the characteristics of crab hemolymphs with those of lobster hemolymph.

The levels of serum protein in the crabs varied considerably from species to species; the levels were all considerably lower than those normally found in the lobster. The hemocyte numbers of C. irroratus and C. borealis were only slightly less than those normally found in the lobster. The correlation coefficients between the serum protein levels and the hemocyte numbers, with the exception of those for female C. borealis, indicated a reasonably direct relation between the levels and the numbers. The pH values for the different crabs and for the lobster were not significantly different. A true fibrinogen appeared to be present in the crabs in low concentrations, whereas fibrinogen forms 7 to 9 percent of the total plasma proteins in lobster.

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8.59 PHOSPHOLIPASE A ACTIVITY IN RAINBOW TROUT MUSCLE

Jonas, R. E. E., and E. Bilinski (Fisheries Research Board of Canada Vancouver Laboratory, Vancouver, British Columbia)
Journal of the Fisheries Research Board of Canada 24, No. 12, 2555-2562 (December 1967)

In previous investigations on the enzymic hydrolysis of lecithin in muscle of rainbow trout, Bilinski and Jonas (1966) showed that deacylation of lecithin to glycerylphosphorylcholine (GPC) was the main catabolic pathway. In agreement with such an enzymic activity, they later found that cold storage of muscle of rainbow trout gave rise to the formation of GPC and free fatty acids. In a mechanism involving two enzymes in the formation of GPC, lysolecithin, which was formed from lecithin by the action of phospholipase A, was deacylated to GPC under the action of lysolecithinase. The presence of lysolecithinase had been well established in fish muscle by other investigators, but evidence for the occurrence of phospholipase A was lacking. The authors initiated the present work to establish this missing link.

The method used to demonstrate the presence of phospholipase A in fish muscle was a modification of the radioactive-tracer procedure used before by the authors. Lecithin labeled with choline-methyl-^{14}C, prepared biosynthetically from fish, was incubated with preparations from the lateral line muscle of rainbow trout (Salmo gairdneri). The formation of lysolecithin ^{14}C was determined after isolation by thin-layer chromatography.

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8.51 (Cross Reference: 2.05)

Other than the differences connected with fibrinogen, no outstanding differences were observed between the lobster and crab hemolymphs. No reason was apparent to exclude C. homari as a potential pathogen for all three species of crabs.

8.51 FREE AMINO ACIDS IN CRAB MUSCLE

Gangal, S. V., and N. G. Magar (Inst. Sci., Bombay, India)
Chemical Abstracts 65, 2687d (July 18, 1966)

8.51 NUCLEOTIDE COMPOSITION OF DNA AND RNA FROM SOMATIC TISSUES OF PINK SALMON AND ITS CHANGES DURING SPAWNING

Berdyshev, G. D., G. K. Korotaev, G. V. Boyarskikh, and B. F. Vanyushin (Inst. Biol. Aktivn, Vesench., Vladivostok, U.S.S.R.)
Chemical Abstracts 68, No. 7, 2773Od (February 12, 1968)

8.51 FLAVOR COMPOUNDS IN VARIOUS FOODS. X - TASTY SUBSTANCES OF EDIBLE CRAB (CHIONOECETES OPILIO)

Take, Tsuneko, Yoko Yoshimura, and Hitoshi Otsuka (Niigata Univ., Niigata, Japan)
Chemical Abstracts 68, No. 7, 28562n (February 12, 1968)

7.80

relations. The highest activity of drugs, pheromones, and pesticides usually require optimization of molecular shape. A PAPA machine with an enlarged memory that is capable of conducting a massive screening of known chemical compounds against desired biological activities might reveal many valuable products. It might be useful for research on the stereochemical specificity of the sense of smell. [14 references]

7.80 ASSESSING BEEF ACCEPTABILITY

Pearson, D. (National College of Food Technology, Weybridge, England)
Food Manufacture 42, No. 11, 42-43 (November 1967)

The author proposes a tentative specification for minced beef that is suitable for application as part of routine control. The specification is based principally on chemical determinations and is designed to set standards for the fat content and freshness of the meat. The critical freshness acceptability limits included were calculated from correlations between the chemical values (volatile nitrogen, free fatty acids of extracted fat, and extract-release volume) and the odor as assessed by a panel. Although the specification was developed from work performed on stored samples of comminuted beef, the author hopes that manufacturers will be encouraged to apply the specification to deliveries of beef. [Abstracter: N. F. Tripple]

8.59

The hydrolyzed lecithin released lysolecithin at an average rate of $67 \pm 14.2 (6)^2$ millimicromoles/gram of lateral line muscle per hour. When preparations of the same muscle were boiled for 5 min. at pH 7.5, no lysolecithin was detected. This lack of lysolecithin showed that the activity obtained was due to the active enzymes present in the muscle. When the incubation time was reduced, the activity obtained was also reduced proportionately; a linear relation was seen between time and enzyme activity between ½ hr. and 4 hr. A pH close to 7.5 appeared to be optimum for phospholipase A activity in the muscle of rainbow trout.

The distribution of phospholipase A activity was determined in subcellular fractions from lateral line muscle. A threefold higher specific activity was obtained from the microsome fraction of the lateral line muscle than was obtained from the total homogenate. The mitochondria had an intermediate level of activity.

These results indicating the enzymic conversion of lecithin to lysolecithin in lateral line muscle of rainbow trout provide the first evidence for the presence of phospholipase A in fish muscle. In view of the present results, the authors believe that fish muscle has the necessary enzymes (phospholipase A and lysolecithinase) to accomplish the conversion of lecithin to GPC in a two-step reaction. However, they do not discount the possibility that lecithin might also be converted to GPC by the action of a single enzyme, either diacylhydrolase or phospholipase B. [26 references]

8.59

was repeated to establish the identity of the compounds that appeared on the chromatogram as aldosterone and 18-hydroxycorticosterone. [^{3}H] Aldosterone was identified in the aldosterone area; 6.5 percent of the radioactivity in this area was [^{3}H] aldosterone. The authors also found that 29 percent of the radioactivity in the 18-hydroxycorticosterone area was [^{3}H]18-hydroxycorticosterone. Although the present study established that herring interrenal tissue does possess the enzyme systems necessary to convert corticosterone to aldosterone, it remains to be determined if aldosterone is produced in vivo at a rate sufficient to reach biologically active levels in body fluids. [14 references]

8.59 18-HYDROXYCORTICOSTERONE: SYNTHESIS IN VITRO AND PROPERTIES OF AN INTERRENAL STEROID IN THE BLOOD OF CARTILAGINOUS FISH (GENUS RAJA)

Idler, D. R., and B. Truscott (Fisheries Res. Bd. Canada, Halifax, Nova Scotia)
Chemical Abstracts 67, No. 1, 1082y (July 3, 1967)

8.59 SURVEY OF A TRYPTIC DIGESTIVE ENZYME IN VARIOUS SPECIES OF CRUSTACEA

Devillez, Edward, and Karen Buschlen (Univ. of Washington, Seattle)
Chemical Abstracts 67, No. 5, 18852x (July 31, 1967)

FREE AMINO ACIDS IN CRAB MUSCLE
COMPOSITION OF FLAVOR COMPOUNDS IN CRAB
NUCLEOTIDE COMPOSITION OF SPAWNING SALMON
ASSESSING ACCEPTABILITY OF BEEF

INTERRENAL STEROID IN CARTILAGINOUS FISH
TRYPTIC DIGESTIVE ENZYME IN CRUSTACEA

9.12 (*) CORONARY DISEASE IN SPAWNING STEELHEAD TROUT SALMO GAIRDNERII

Van Citters, Robert L., Noland W. Watson (Department of Physiology and Biophysics and Regional Primate Research Center, University of Washington School of Medicine, Seattle)
Science 159, No. 3810, 105-107 (January 5, 1968)

The Pacific salmons and steelhead trout (Salmo gairdneri) are related anadromous fish that have a common habitat but have different spawning histories. Salmon die after spawning, whereas most steelhead survive spawning, many return to the sea, and some spawn again. Spawning salmon develop widespread vascular degeneration that frequently affects the coronary arteries. This fact led the authors to consider the prevalence, and possible reversal, of this degeneration in steelhead trout. The fact that steelhead survive spawning raised the question of whether vascular degenerative disease even occurs in these fish. The ultimate return of some steelhead for repeated spawning suggested the possibility that they may have survived because they escaped development of pathological vascular changes. It was also considered possible that vascular degeneration was as ubiquitous among spawning steelhead as among salmon but that the degenerative process regressed in the steelhead after spawning. The authors investigated these hypotheses in a systematic sampling of 222 steelhead trout during all stages of their life cycle. The results showed that the incidence of coronary vascular degeneration in steelhead trout approached 100 percent during spawning and implied that the lesions regress after spawning.

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ABSTRACTER: M. F. Tripple

9.14 STOMACH CONTENTS OF ADULT STARRY FLOUNDER AND SAND SOLE IN EAST SOUND, ORCAS ISLAND, WASHINGTON

Miller, Bruce Stuart (College of Fisheries, University of Washington, Seattle)
Journal of the Fisheries Research Board of Canada 24, No. 12, 2515-2526 (December 1967)

Studies on the food habits of flatfish have been extensive; however, none of the species on the Pacific coast have been studied on a seasonal basis. Orcutt (1950) did report a change in food habits with size and age of starry flounder, but no other detailed studies have been conducted. This paper describes and compares the stomach contents of the adult starry flounder (Platichthys stellatus Pallas) and the adult sand sole (Psettichthys melanostictus Girard) on a seasonal basis. The diel feeding habits of the two species are also examined.

Age-length data indicated that the majority of the starry flounder sampled were between 3 and 6 years of age and ranged in size from 306 to 565 millimeters total length; the majority of the sand sole were between 2 and 4 years of age and ranged in size from 284 to 454 mm. Starry flounders fed mainly on nemerteans, priapulids, polychaetes (both errant and sedentary forms), and lamellibranchs; small crabs and brittle stars were of minor importance. The sand soles fed mainly on fish (primarily Clupea pallasi); mysids, shrimp, and squid were of minor importance. The starry flounder cracked the shells of large bivalves, but they swallowed small bivalves, brittle starfish, and pea crabs whole. They

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ABSTRACTER: M. F. Tripple

9.16 (*) FISH FARMING

Anonymous
Nature 217, No. 5130, 704-705 (February 24, 1968)

The depletion of fish supplies accessible to British fishermen has led to the investigation of alternative sources, and to the realization that cultivation of fish and shellfish can lead to advantages in processing and marketing. Plaice was one of the first fish to be investigated, and much has been learned by collecting eggs at sea and rearing young plaice in tanks and ponds. The optimum conditions of temperature, salinity, light, water exchange, and quantity of food have been investigated for plaice. In the future, however, it is likely that sole will be cultivated more widely than plaice because sole is more valuable, the young grow readily, and the adults adapt to tank life and can be induced to spawn. Sole is also suitable for cultivation in the heated sea water put out by power stations. Turbot, brill, and some shellfish are also likely candidates for cultivation in heated sea water.

Oysters of the Ostrea edulis variety were once common around Britain, but the breeding stock has been reduced to such an extent that any recovery of the oyster industry will depend on successful artificial rearing. Progress in artificial breeding of oysters has led to the commercial techniques now being used, and a commercial hatchery now being built is likely to produce a steady supply of young oysters. The possibility of growing New Zealand and American oysters and American clams is also being investigated.

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*Items on back of card.

ABSTRACTER: M. F. Tripple

9.17 EXPLOITATION OF MULTIPLE STOCKS BY A COMMON FISHERY

Paulik, G. J. (College of Fisheries, University of Washington, Seattle); A. S. Hourston, and P. A. Larkin (Fisheries Research Board of Canada Biological Station, Nanaimo, British Columbia)
Journal of the Fisheries Research Board of Canada 24, No. 12, 2527-2537 (December 1967)

The authors present a complete analytical treatment of the problem of determining the common rate of exploitation that will produce the maximum total equilibrium yield from a mixture of fish stocks when each of the individual stocks is governed by a separate Ricker-reproduction curve. The stocks may differ in both the parameters of reproductive potential (designated as "a") and in absolute magnitude (replacement stock size). The authors assume that estimates of both of these parameters are available for each stock. The gain in total yield realized by fishing and regulating each stock separately are also studied. A computer program that makes it possible to examine a number of other fishing strategies is presented. An example of a strategy is to obtain the maximum total equilibrium yield of a mixture of stocks while keeping the rate of exploitation less than that which will exterminate any of the stocks. The subject is developed with particular reference to Pacific salmon, for which joint fisheries on mixtures of stocks are common. There are, however, obvious applications to the management of other species of fish, and to harvesting mixed populations of other animals where recruitment considerations are predominant.

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ABSTRACTER: M. F. Tripple

CORONARY DISEASE IN SPAWNING STEELHEAD TROUT

FEEDING HABITS OF STARRY FLOUNDER AND SAND SOLE

FISH FARMING IN ENGLAND

DETERMINING RATE OF STOCK EXPLOITATION

9.14

swallowed whole or severed nemerteans, priapulids, and polychaetes. The sand sole swallowed fish, shrimp, and squid tail first. Mud was commonly found in the stomachs of starry flounder; it was never found in the stomachs of sand sole.

There appeared to be a definite seasonal trend in feeding intensity for the starry flounder. The most intense feeding period was from about July to October. By January, the month with the lowest bottom temperature, feeding had stopped, and it did not begin again until about June. During the months of January, February, April, and June, the entire digestive tract was empty. The sand sole did not show a marked seasonal change, but during January the highest percentage of empty stomachs was found and no full stomachs were noted. Sand sole were apt to have more food in their stomachs than starry flounder were, even during the months when both species were apparently actively feeding.

The diet changed during the year for both species. In 4 out of the 6 months of feeding, clams were the most important food for the starry flounder; polychaetes and pea crabs were consistent in the diet throughout the year. The sand sole ate predominately fish; mysids and shrimp were important during the summer months and squid were eaten during the winter.

The starry flounder apparently began eating about sunrise and continued feeding until about sunset. About 8 hours after sunset, all the flounders had empty stomachs. The sand sole fed on fish about between sunrise and sunset. Complete digestion took longer than the 24 hours. The percentage of empty stomachs was highest between 5:30 and 6:30 a.m.; shortly before sunrise there were no empty stomachs. The starry flounder appeared to empty their stomachs in 5 to 8 hours, whereas sand sole appeared to hold fish in their stomachs for more than 24 hours. [20 references]

9.12

Although the incidence of vascular degeneration approached 100 percent in fish at the time of spawning, some steelhead trout that were known to have spawned 1 to 2 years previously were found to be normal. The degeneration process in second-time spawners resembled that of first-time spawners taken at the same stage of migration. These findings implied that the degenerative process regressed after spawning and that such reversal was a naturally occurring phenomenon.

The authors state that they are not aware that reversal of coronary lesions is a normal event in the life cycle of any animal. Regressions of human atherosclerotic lesions may occur during starvation, wasting disease, and malnutrition. Lesions induced in humans by atherogenic diets may also regress after the diet is stopped or after manipulation of hormone levels. The fish under investigation probably starve during the fresh-water phase of their migration, when the lesions are in the stage of rapid development. The role of hormones in the degenerative process has been suggested by Robertson et al. (1961), who showed that the quantity of 17 hydroxycorticosteroids markedly increased during the spawning migration.

9.12 SEASONAL VARIATIONS IN CALCIUM, INORGANIC PHOSPHATE, AND ALKALINE PHOSPHATASE CONTENTS OF OPHICEPHALUS PUNCTATUS

Siddiqi, M. A., and Majid Siddiqi (Muslim Univ., Aligarh, India)
Chemical Abstracts 64, 14642h (May 9, 1966)

9.13 ^{137}Cs IN FISH, PLANKTON, AND PLANTS IN FINNISH LAKES DURING 1964-5

Kolehmainen, S., E. Hasanen, and J. K. Miettinen (Univ. Helsinki, Finland)
Chemical Abstracts 68, No. 1, 668c (January 1, 1968)

9.13 RADIOACTIVITY OF SEA FISH IMPORTED TO CZECHOSLOVAKIA IN THE YEARS 1962-1965

Pinkas, J., and J. Pluhar (Ustredni Statni Vet. Ustav, Prague, Czechoslovakia)
Chemical Abstracts 68, No. 1, 669d (January 1, 1968)

9.14

The following symbols are used: $Z = We^{a(1-W)}$ is the reproduction curve for a single population; W is the parental generation; Z is the progeny; a is the reproductive potential; Z_T is the total number of recruits; n is the stocks; E_i is the spawning population size; C_i is the sustained yield; and C_T is the total maximum sustained yield.

The total number of recruits from a combination of stocks is expressed by

$$Z_T = \Sigma Z_i = \sum_{i=1}^{i=n} A_i W_i e^{a_i(1-W_i)}$$

where $i = 1, \ldots, n$ and A_i are the coefficients associated with relative magnitudes of stock sizes at replacement levels.

The size of the spawning population associated with a sustained yield at a given rate of fishing on a particular stock is expressed by $E_i = A_i W_i$, and the sustained yield is expressed by $C_i = Z_i - E_i = A_i W_i^{A_i(1-W_i)} - A_i W_i$.

If the stocks are harvested separately, the total maximum sustained yield is the sum of the individual maximum sustained yields. The number of spawners for each stock that will produce the maximum total yield is found by setting to zero the partial derivatives with respect to W_i in the following expression:

$$C_T = \sum_{i=1}^{i=n} C_i = \sum_{i=1}^{i=n} [A_i W_i e^{a_i(1-W_i)} - A_i W_i].$$

9.16

The English prawn is another species suitable for artificial cultivation, despite certain difficulties that must be overcome. As with all other artificially reared fish, the feeding problem for shrimps remains to be solved completely. Although the brine shrimp Artemia is a good food source for many kinds of fish, attempts are being made to produce an artificial food with a protein base. Waste fish and poultry offal may provide the basis for such a food. Attempts are also being made to find a herbivorous fish, such as gray mullet or Tilapia, that is palatable and marketable.

9.19 ORGANOCHLORINE RESIDUES IN MARINE ORGANISMS

Robinson, J., A. Richardson, and A. N. Crabtree (Shell Research Ltd., Tunstall Laboratory, Sittingbourne, Kent, England); J. C. Coulson and G. R. Potts (Department of Zoology, University of Durham, England)
Nature 214, No. 5095, 1307-1311 (June 24, 1967)

In 1965, analyses by Moore et al. revealed that sea birds and land birds contained comparable amounts of residues of organochlorine insecticides. Since insecticides are not normally applied to a marine environment, and since there is every reason to believe that they have been extensively diluted by the time they reach the sea, the occurrence and accumulation of such substances in marine organisms has far-reaching implications. In pursuit of an answer, the authors of the present article investigated a wide range of marine organisms collected from the eastern coast of Britain, mainly from around the Farne Islands, Northumberland.

Each species examined was assigned to a trophic level according to the food it basically eats: Trophic level 1, plants; 2, animals that feed on plants; 3, predators of animals in level 2; 4, large predators that feed primarily on predators in level 3; level 5, larger predators that feed primarily on predators in level 4. The organocholeine insecticides were divided into two classes: the polar oxygenated compounds, such as 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4,5,8-dimethanonaphthalene (HEOD) and endrin; and the relatively nonpolar compounds, such as pp'-DDT (dichlorodiphenyltrichloroethane) and pp'-DDE (1,1-dichloro-2,2-bis(p-chlorophenyl)ethene.

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 ABSTRACTER: L. Baldwin

9.2 STUDIES ON ESTIMATING PARAMETERS OF A FISH POPULATION SUPPLIED BY SEQUENTIAL RECRUITMENT.
II - A METHOD OF SIMULTANEOUS ESTIMATION BY MINIMIZING THE TRACING INDEX

Ishii, Takeo (Ocean Research Institute, University of Tokyo, Nakano, Tokyo, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 8, 738-745 (August 1967)

Ordinary methods of estimating the parameters of a fish population that is sequentially recruited often give biased values. For example, ordinary statistical methods cannot be applied to estimates of the population of most commercially caught tuna, for their recruitment occurs over a range of ages. The author has proposed a method for estimating the parameters of such complex fish populations. Sequential recruitment will not influence the estimates made with the method, nor, says the author, will any modification of the fish population created by new biological findings. Moreover, the method permits simultaneous estimation of a variety of parameters.

The basic concept of the method is to define a quantity that will indicate the goodness of the tracing between the actual and the simulated catch matrices. In the search for the most desirable value of the quantity, the author used the steepest slope method. The tracing index τ was used as the quantity. He derived τ from the equation $\sum_h \left[\sum_k \left\{ \frac{(C_{Ohk} - C_{Thk})^2}{C_{Thk}} \right\} \right]$ where C_{Ohk} is the actual catch of

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 ABSTRACTER: L. Baldwin

9.2A TRADE -- REPORT OF THE INDIAN SEA FOOD DELEGATION TO FAR EAST COUNTRIES (1964)

Anonymous
Marine Products Export Promotion Council, Ernakulam, India (March 1964)
Indian Fisheries Bulletin 11, No. 2, 28-30 (April 1964)

The report of the Indian Seafood Delegation to the Far East Countries (1964) is divided into two parts: general conclusions and recommendations.

General conclusions.--The delegation concluded that the discussions held in Rangoon, Hong Kong, and Singapore were the most profitable. The possibility of an expanded trade in dried prawns is especially promising in Rangoon. In Hong Kong and Singapore, such dried seafoods as prawns, shark fins, fish maws, and Bombay ducks will sell well. In addition, products such as abalone, compoy, cuttlefish, and oysters, which India does not produce commercially, are extremely popular. The possibility of producing them for export should be considered.

Since Hong Kong and Singapore (which are about 100 percent and 80 percent Chinese, respectively) are free ports and import goods not only for local consumption but for re-export, the seafood demands of the Chinese populations all over the world should receive close attention. These populations are extremely quality conscious, so scientific methods of processing, grading, and packaging should be emphasized.

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 ABSTRACTER: L. Baldwin

9.2B MARKET SURVEY REPORT -- INDIAN FROG LEGS IN FRANCE

Anonymous
Marine Products Export Promotion Council, Ernakulam, India (1964)
Indian Fisheries Bulletin 11, No. 2, 30-32 (April 1964)

The Marketing Research Corporation of India has made nine recommendations for promoting the export of Indian frog legs to France.

1. An agency, either within the Marine Products Export Promotion Council or at the State level, should be set up to assess the availability of frog legs in India. The information will enable exporters to book larger orders.
2. Establishment of frog farms should be encouraged, either by State action or through incentives to private producers.
3. Special research teams should investigate ways of breeding improved species of frogs, particularly those that suit the French consumer's tastes.
4. Procurement of frogs should be rigidly controlled and indiscriminate catching of baby frogs discouraged.
5. The importance and the means of quickly handling foreign correspondence should be stressed.
6. Standards of packaging frog legs should be improved--the legs should be skewered, individually wrapped in cellophane, and arranged horizontally in boxes
7. Frog legs should be given a preshipment hygiene inspection; those that pass should be specially marked. Importers should be informed of the procedure.
8. Since the consensus is that frozen frog legs should cost about 70 percent of fresh ones, prices should be lowered if at all possible.

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 ABSTRACTER: L. Baldwin

9.2

k-year-olds in h-year class, and C_{Thk} is the simulated value of the catch of k-year-olds in h-year class. As the value of τ decreased, the goodness of the tracing between actual and simulated catches increased. The most desirable value for τ, then, was its minimum.

In searching for the minimum, the author made two types of estimation: a linear one, for finding the direction of the steepest descent; and a quadratic one, for finding the minimum point of τ. With the aid of a computer, he made his analysis as follows. A starting point was chosen at random from the range between a and b, $\rho[a,b]$, which was designated beforehand for each factor. When the surface was assumed to be a plane, the steepest descent direction of τ at the starting point was calculated by a factorial design, with 2δ the level difference in each variable. Forward movement was made in the direction of steepest descent by two steps; then the direction at the new point was calculated. The distance of one step was found for one particular parameter, and then the actual change in distance caused by the direction was found. This procedure was repeated as long as value of τ decreased.

When the value of τ began to increase, the surface was assumed to be quadratic, and the minimum point of τ was estimated by the composite design, with the level difference being the same size as before. The estimation of the minimum point was successively extrapolated at each estimated point until the new point was within the level difference of measurement. The final point was taken as the estimated value of the parameter.

To avoid erroneous estimates due to unanticipated sources of error, the author repeated both types of estimation ν times, starting with different randomly selected points. The estimated value was accepted only when the standard deviation between ν trials was less than the prechosen value for each factor. [10 references]

9.19

Only HEOD and pp'-DDE were found in significant amounts. Below are some of the species examined and the concentrations of organochlorine compounds found.

Species	Trophic level	Concentration	
		HEOD (ppm)	pp'-DDE (ppm)
Wrack	1	0.001	0.002
Oar weed	1	0.001	0.003
Mussel	2	0.023	0.024
Cockle	2	0.018	0.012
Lobster	3	0.024	0.024
Crab	3	0.015	0.061
Plaice	3	0.038	0.023
Herring	3	0.057	0.080
Cod	4	0.009	0.012
Whiting	4	0.040	0.021

Between February 1965 and October 1966, the concentration of pp'-DDE in cod and sand eels varied by a factor of 15 and the concentration of HEOD by a factor of 32, the minimum occurring in the winter and the maximum in the summer. Whether the fluctuations were caused by season, species characteristics, or movement of the fish was not determined. The authors are planning parallel investigations using mussels to eliminate the variable of movement.

Usually the concentration of both compounds correlated with the trophic level. Although the relation could be a matter of progressive accumulation and concentration through the food chain, the authors found that the concentration of HEOD in cod was less than that in its main food, the sand eel; likewise, the concentration of HEOD in any one species of fish was less than that in planktonic crustacea. On the other hand, an appreciable rise in concentration appeared at successive stages of the food chain plankton-to-mussels-to-eider duck. Thus, concentration may be a matter of equilibrium between intake and excretion. [16 references]

9.2B (Cross Reference: 1.01512)

9. A publicity program using television, advertisements in professional magazines, and special menus in cook books should be instituted; it should be directed toward the housewife as well as the major potential customer, the restaurateur.

A breakdown of India's exports and imports for the 12 months ending in March 1964 completes the survey of India's fisheries trade. A summary of the breakdown appears below.

Product	Value in rupees	
	Export	Import
Live, chilled, frozen, and wet-salted fish	111,601	53,695,425
Salted, dried, and smoked fish and fish parts	18,647,869	1,072,368
Canned fish and fish products	6,762,792	50,240
Fresh, chilled, frozen, salted, dried, and cooked crustacea and mollusks	50,326,740	54,769,600
Miscellaneous products (uncanned preparations, fats and oils, turtles, and such inedible products as fertilizers, shells, bones, and pearls)	6,984,349	7,516,404

9.2A (Cross Reference: 1.01512)

Recommendations.--The delegation recommended action by exporters, the Marine Products Export Promotion Council, and the Central Institute of Fisheries Technology. Exporters were urged to ensure that exported prawns be well dried, curved in shape, free of extraneous matter, and shipped as soon as possible after being cured--and by the fastest available steamers so they will be fresh and bright in color when they arrive. Processors of shark fins are warned against making their cuts in such a manner that fleshy matter is retained on the fins; no economic advantage is derived from such a liberal margin of excision--quite the contrary. Since the Chinese community consumes not only the hind legs of frogs but the rest of the body as well, possibilities of building up a market for this now discarded product should be explored.

The Marine Products Export Promotion Council was urged to try to translate quality consciousness into practical action. Voluntary preshipment inspection (pending the time that compulsory preshipment inspection is required) should be encouraged. On-the-spot studies of the methods used in Singapore for grading shark fins and of the floating seafood restaurant in the Aberdeen District of Hong Kong were recommended. Also, the Council should explore ways of securing credit facilities for exporters and investigate the feasibility of setting up a small trade center-depot in Hong Kong where goods can be stored or disposed of.

The Central Institute of Fisheries was asked to give special attention to the technical problems of packaging and of ensuring a bright pink color in dried prawns. The findings must then be widely disseminated to processors.

(Continued on Card 9.2B)

0.2 (*) SODIUM EXTRUSION BY GIANT MUSCLE FIBRES FROM THE BARNACLE

Beaugé, L. A. (Consejo Nacional de Investigaciones Científicas y Técnicas, Argentina), and R. A. Sjodin
Nature 215, No. 5107, 1307-1308 (September 16, 1967)

The authors found that the average intracellular content of sodium in freshly isolated single, giant muscle fibers from the barnacle, Balanus nubilus, was 15 mmoles per kilogram of fiber. If the intracellular sodium is uniformly distributed in the cell water, the internal concentration must be about 20 mmoles per liter. The purpose of the work presented in this report was to show that giant muscle fibers from the barnacle can produce a net extrusion of sodium ions against an electrochemical gradient. The results showed that on the average the fibers recovering in a medium that contained potassium extruded 12 milliequivalents of sodium per kg. of muscle and gained 15 meq. of potassium per kg. of fiber. The net outward extrusion of sodium obviously took place against an electrochemical gradient, since the outside concentration of sodium was more than 10 times the magnitude of the intrafibrillar concentration and the fibers maintained an internal electrical negativity. [Abstracter: M. F. Tripple]

*Item on back of card.

0.5 (*) GROWTH CHARACTERISTICS OF HETEROTROPHIC BACTERIA IN SEA WATER

Jannasch, Holger W. (Woods Hole Oceanographic Institution, Woods Hole, Massachusetts 02543)
Journal of Bacteriology 95, No. 2, 722-723 (February 1968)

The study of in situ rates of microbial transformation of dissolved organic materials in the sea is handicapped by the minute concentrations of substrates present and the complexity of sea water as a medium for analytical work. An indirect approach is to use growth studies in continuous culture. This method has been used successfully and has led to some results of general interest.

Data from the present experiment suggest that part of the heterotrophic marine bacterial population is adapted to growth on the low substrate concentrations present in sea water. This population is able to successfully compete with species that are growing less efficiently under the same conditions. Another observation is that in continuous culture of some of the isolates, the limiting substrate is not consumed beyond a certain threshold concentration. The phenomenon observed by the author appears to represent an expression of the suboptimal character of sea water as a base medium for the growth of some heterotrophic bacteria. [Abstracter: M. F. Tripple]

*Item on back of card.

0.35 (*) DETERMINATION OF ELONGATION OF FATTY ACIDS

Rabinowitz, Joseph L. (Radioisotope Service, Veterans Hospital, Philadelphia, Pennsylvania 19104)
Analytical Biochemistry 22, No. 3, 498-510 (March 1968)

The ratio of the activities of carboxyl CO_2 to those of alkyl CO_2 was determined from the averaged values of the two specific activities. On the basis of this ratio, a technique was developed for evaluating samples of fatty acids yielded by either elongation of shorter fatty acids or by de novo synthesis. The limitations of the system were established, and tables were calculated for interpreting the data obtained by using the technique. [20 references]
[Abstracter: L. Baldwin]

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2.1127 (*) STUDIES ON THE BAIT IN TROLLING.
V - RELATION BETWEEN THE SIZE OF LIVE BAIT AND ITS BIOLOGICAL ACTIVITY, MORTALITY AND ESCAPE (OR DROPPING OUT), IN TUNA LONG-LINE FISHERY

Okabayashi, Syōzyūro
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 11, 1025-1027 (November 1967) (In Japanese; summary and tables in English)

To clarify the relation between the size of live bait used in the tuna long-line fishery and its activity (measured by the amount of tension on the line), mortality, and rate of escape, the author tested two sizes of horse mackerel--one larger and one smaller than the bait normally used. The tests revealed the following about bait that had been 8 hours on the hook.

1. Activity.--Lightly hooked bait (both large and small) was in far better condition than deeply hooked bait. However, the lightly hooked bait caused many of the lines to become entangled.

2. Mortality.--Generally speaking, the small bait kept better than the large bait did. The mortality of large bait was 4 percent and 2 percent for deeply hooked and lightly hooked bait, respectively. The mortality of small bait was the same (4 percent) for both kinds of hooking.

3. Escape.--Large bait escaped at a rate of 20 percent when lightly hooked and at a rate of 14 percent when deeply hooked. Small bait escaped at a rate of 4 percent regardless of how it was hooked. [Abstracter: L. Baldwin]

*Item on back of card.

0.35 ANTIOXIDANT MECHANISMS AGAINST OXYGEN TOXICITY AND THEIR IMPORTANCE DURING THE EVOLUTION OF THE BIOSPHERE

Gilbert, Daniel L. (Natl. Inst. of Neurol. Diseases and Blindness, Bethesda, Maryland)
Chemical Abstracts 66, No. 19, 82367z (May 9, 1967)

0.38 EVOLUTION OF STRUCTURE AND FUNCTION OF PROTEASE

Neurath, Hans, and Kenneth A. Walsh (Department of Biochemistry, University of Washington, Seattle); and William P. Winter (Howard Hughes Medical Institute, Department of Biochemistry, University of Washington)
Science 158, No. 3809, 1638-1644 (December 29, 1967)

A new parameter in the characterization of the structure and function of several proteolytic enzymes has recently been introduced by considerations of the evolution of enzymes and their phylogenetic variations. Enzymes or proteins that are believed to fulfill similar catalytic functions have been found to show certain similarities in structure. Conversely, it is possible to deduce the structural requirements for function from considerations of the evolutionary patterns and phylogenetic variations of classes of enzymes. This approach appears particularly promising in the case of proteolytic enzymes, since, for the most part, these enzymes contain no prosthetic groups and their function is therefore directly coded in the amino-acid sequence.

The phylogenetic relations among enzymes are considered in terms of analogies and homologies. Observed homologies are divided into two categories on the basis of the relation between the individuals from which the proteins were derived. This type of classification provides a frame of reference within which the mechanism of protein evolution and the significance of gene duplication are discussed. Homologies among proteolytic enzymes are also discussed, using analogous mechanisms as a basis for classification of the enzymes. [81 references]

[Abstracter: M. F. Tripple]

0.2 MECHANISM OF OLFACTORY TRANSDUCTION

Rosenberg, Barnett, T. N. Misra (Department of Chemistry, University of British Columbia, Vancouver 8, British Columbia); and Robert Switzer
Nature 217, No. 5127, 423-427 (February 3, 1968)

On the basis of the experimental results described in this paper, the authors propose the following as a possible mechanism for olfactory transduction. Pigments in the pigmented olfactory receptors are the receptor sites. These pigments also exist to a lesser degree in the limiting resistance membrane of the receptor cells. The odorous molecule forms a donor-acceptor complex with the pigment molecule when it is adsorbed on the receptor site. The conductivity of the membrane increases because the donor-acceptor complex results in an increase in the equilibrium number of charge carriers. This increase in conductance is an amplifying process, which leads to the depolarization of the membrane and signal generation. The donor-acceptor complexes are weakly coupled and break up, which leads to a desorption of the odorous molecule when the partial pressure of these molecules in the ambient atmosphere decreases. The nature of the donor-acceptor complex determined the amount of increase in conductance and the threshold sensitivity to the odorous molecule. The odorous molecule may form donor-acceptor complexes of different strengths with the different pigments of the various receptor types; the resulting complex of signals defines the odor quality of that molecule. Such donor-acceptor complexes may form to a lesser degree between some molecules and the phospholipid constituents of an unpigmented membrane, and these complexes produce similar, though weaker, signals through the same mechanism [16 references]

[Abstracter: M. F. Tripple]

CHEMISTRY AND BIOCHEMISTRY

2.1111 APPLICATION OF RUBBER-COVERED STEEL-WIRE-ROPES IN FISHING GEAR

Girenko, V. N.
Rybnoe Khoziaistvo 39, No. 10, 39-40 (1963) (In Russian)
World Fisheries Abstracts 18, No. 3, 17-18 (July-September 1967)

The technique of covering steel-wire rope with rubber or plastic is identical to that presently used for covering electric cables; it can be handled with the same industrial equipment. Thus, the costs of both the material and the work are much less than the costs of hand whipping steel-wire rope with tarred vegetable cord--the present usual practice. Wire ropes of rubber-covered steel were used experimentally for 4,000-meter-long headlines in drift nets and for 2,000-meter-long leader cables in a trap net.

They handled most satisfactorily in the drift nets, coiling well and not kinking when shot. The rubber covering on the headlines resisted wear and tear well and adequately protected the wire rope from corrosion.

The leader cables of the trap net, after 5 months in the water, were stored for about 1½ years. Since the rubber covering was still intact at the end of this time, the cable was put back in service. It probably can be used for another 2 years.

The author concludes that a rubber covering from 2 to 3 millimeters thick will increase the life of steel-wire rope by from 1½ to 2 times. He suggests that experiments also be conducted on plastic coverings--for example, on vinyl chloride.

[Extractor: L. Baldwin]

0.5 PROPERTIES OF BACTERIA ISOLATED FROM DEEP-SEA SEDIMENTS

Quigley, M. M., and R. R. Colwell (Department of Biology, Georgetown University, Washington, D.C. 20007)
Journal of Bacteriology 95, No. 1, 211-220 (January 1968)

The present study covers the characterization, identification, and classification of bacterial cultures isolated from sediment samples obtained from the Philippine Trench and the Challenger Deep in the Marianas Trench of the Pacific Ocean. This study of the morphology, physiology, and biochemistry of the pure bacterial cultures represents the first extensive compilation of information for deep-sea bacteria.

A computer was used for the taxonomic analysis of isolates, 31 of which were from sediment samples collected at depths of 9,400 and 10,400 meters and 7 of which were from sea-water samples collected at various depths from surface to 4,000 meters. A total of 116 characteristics were determined for each isolate; these were coded and put on punch cards. Two recently developed computer programs were used for the analysis of similar values. The numerical analysis showed five distinct phenetic clusters. Four of the clusters were identified as species of the genus Pseudomonas, and one was identified as an aerogenic species of Aeromonas. One group in a cluster was identified as pigmented Pseudomonas fluorescens. A major cluster, which consisted of two groups that merged at a species level of similarity, was treated as a new species of Pseudomonas. The data for the 38 strains were compared with data for 132 marine and nonmarine strains previously subjected to taxonomic analysis by computer. The barotolerant deep-sea strains clustered separately from all other marine strains; the one exception was the deep-sea P. fluorescens isolates. [37 references]

[Abstracter: M. F. Tripple]

4.11 (*)

ALKOXYLIPIDS. IV - SYNTHESIS AND CHARACTERIZATION OF NATURALLY OCCURRING ETHERS, ESTERS AND ETHER ESTERS OF DIOLS

Baumann, W. J., H. H. O. Schmid, H. W. Ulshöfer, and H. K. Mangold (University of Minnesota, The Hormel Institute, Austin)
Biochimica et Biophysica Acta, Lipids and Lipid Metabolism 144, No. 2, 355-365 (October 2, 1967)

The chemical synthesis of diol lipids, studies of the physical properties of these compounds, and methods applicable to the separation, isolation, and characterization of individual diol lipids from natural sources are all described. The synthesized products are being used in the evaluation of the nutritional effects of diol lipids and the elucidation of the metabolism of these unusual lipids.

Long-chain alkyl ethers of 1,2-ethanediol were prepared from alkyl glyceryl-(I)-ethers by glycol cleavage and reduction of the resulting alkoxyacetaldehydes. Alkyl ethers of 1,3-propanediol were synthesized by alkylation of 3-trityl-oxy-propanol with methanesulfonates. This was followed by hydrolytic removal of the trityl group. Dialkyl ethers, ether esters, as well as mono- and diesters of 1,2-ethanediol and 1,3-propanediol were prepared.

Chromatographic methods based on partition, rather than on adsorption phenomena, were suitable for the separation of diol lipids as classes from the corresponding glycerol derived lipids. The critical solution temperatures of the synthesized compounds were used as a satisfactory means of distinction. [49 references]
[Abstracter: M. F. Tripple]

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6.54 (*)

UTILIZATION OF FISH PROTEIN CONCENTRATE IN MAN

Spencer, Herta, Isaac Lewin, Josephine Fowler, and Joseph Samachson (Metabolic Research Unit, Veterans Administration Hospital, Hines, Illinois)
Federation Proceedings 27, No. 2, Abstract No. 1169, p. 423 (March-April 1968)

The availability of the protein and minerals contained in fish protein concentrate (FPC) to humans was studied under constant dietary conditions. An average of 37 percent of the protein content of the control diet was replaced by the protein of FPC; all other dietary constituents remained constant. The urinary excretions of nitrogen, calcium, and phosphorus, and the balances of these elements were similar both in the control and in the group fed FPC. Because the FPC used in the test diet contained fluoride, balances of fluoride were performed by determining the intake and the urinary and fecal excretions of fluoride in the control and in the test group. The fluoride intake of the control group averaged 4.4 milligrams per day, and the fluoride balance was +1.9 mg. per day. The fluoride intake of the test group averaged 12 mg. per day, and the fluoride balance was + 4.5 mg. per day. During the intake of FPC, the fluoride balance was +4.5 mg. per day; during the intake of sodium fluoride, it was +5.4 mg. per day. The fecal fluoride excretion was somewhat lower with the intake of sodium fluoride than with the intake of FPC. The data indicated that nitrogen, calcium, and phosphorus were as readily available from FPC as from the control diet, and that the availability of fluoride from FPC was similar to that of the availability from sodium fluoride.
[Abstracter: M. F. Tripple]

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4.21 (*)

STUDIES ON DISCOLORATION OF FISHERY PRODUCTS. III - PARTICIPATION OF RIBOSE IN RUSTING OF FISH MUSCLE IN MODEL DEHYDRATED SYSTEMS

Toyomizu, Masamichi, Tunemichi Yamazaki, and Yoshihiro Komori
Bulletin of the Japanese Society of Scientific Fisheries 34, No. 2, 143-145 (February 1968) (In Japanese; summary and figures in English)

In a previous paper (1967), the authors pointed out that the low molecular weight fraction obtained from the dark muscle of jack mackerel plays an important role in the rusting of the dark muscle that is caused by lipid oxidation. Because appreciable amounts of hexose and pentose occur in the dark muscle, they have now studied the role of reducing sugar in the rusting reaction.

First they devised a model dehydrated system in which ribose, a phosphate buffer at pH 6.85, and jack mackerel lipids were added and albumin was used as a support medium for the reactants. They also devised a system in which lysine, ribose, jack mackerel lipids, and the phosphate buffer (pH 6.85) were added and Celite was the support medium. Then they studied the discoloration rate of the systems following storage at 30° C. for 14 days. The findings, along with the reflectance spectra of the systems and of rusted dark muscle, suggest that sugar probably plays a part in the rusting reaction.
[Abstracter: L. Baldwin]

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8.51 (*)

NEW GENOTYPES IN COD AT GREENLAND

Jamieson, Alan (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England)
Nature 215, No. 5101, 661-662 (August 5, 1967)

A knowledge of the genetic diversity in cod is useful for estimating the degree of isolation of the various breeding stocks, for application to stock conservation problems, and for the routine classification of fishery statistics. In 1966, Møller described 11 molecular patterns of iron-binding proteins. or transferrins, appearing in the blood sera of cod (Gadus morhua) caught along the Norwegian coast and in the Barents Sea. Ten of the patterns represented all the possible genotypes attributable to four equidominant allelomorphs, Tf^A, Tf^B, Tf^C, and Tf^D. Each transferrin gave a discrete electrophoretic band, decreasing electrophoretic mobility following the alphabetical order of the allelomorphic suffix. The eleventh pattern represented a rare protein having a mobility somewhat faster than that of Tf^C, the commonest of the cod transferrin genes. He called it Tf^{C1}.

Møller's genetic interpretation anticipated the existence of Tf^A/Tf^{C1}, Tf^B/Tf^{C1}, Tf^{C1}/Tf^{C1}, and Tf^{C1}/Tf^D, all of which were found by the present author in the blood sera of West Greenland cod. In the 708 cod sampled, the order of magnitude was consistently $Tf^C > Tf^B > Tf^A > Tf^D > Tf^{C1}$, although Tf^C was found less frequently in Greenland cod than in cod previously caught elsewhere in the North Atlantic, and the frequency of the other genes was correspondingly higher.
[Abstracter: L. Baldwin]

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4.21 LIPID PEROXIDATION

Lynn, William S. (Duke Univ. Med. Center, Durham, North Carolina)
Chemical Abstracts 67, No. 5, 1776le (July 31, 1967)

4.21 OXIDATION OF LIPIDS OF FREEZE-DRIED FOODS DURING STORAGE. II - EFFECT OF BACKFLUSHED GAS ON THE OXIDATION OF LIPIDS

Ohata, Susumu, Akira Hiyoshi, Hiroshi Sakurai, Takayasu Asari, and Kinshi Suminoe (Tokyo Agr. Univ., Tokyo, Japan)
Chemical Abstracts 68, No. 7, 28565r (February 12, 1968)

8.51 ELECTROPHORETIC INVESTIGATION OF PROTEINS AND LIPOPROTEINS IN THE NAVAGA AND COD OF THE WHITE SEA

Shatunovskii, M. I., K. F. Sorvachev, and F. A. Isaev
Chemical Abstracts 67, No. 25, 114626x (December 18, 1967)

8.51 HYPERSENSITIVITY TO FISH. PARTIAL PURIFICATION AND CRYSTALLIZATION OF A MAJOR ALLERGENIC COMPONENT OF COD

Aas, K., and J. W. Jebsen (Rikshosp. Univ. Hosp., Oslo, Norway)
Chemical Abstracts 68, No. 5, 20525g (January 29, 1968)

4.29 COLOR IMPROVEMENT OF SOLVENT EXTRACTED FATS AND OILS BY TREATMENT WITH HYDROGEN PEROXIDE

U.S. Patent 3,338,932
Chemical Abstracts 68, No. 5, 21058u (January 29, 1968)

8.51 AMINO ACID COMPOSITION OF JAPANESE FOODS

Tamura, Sinpatiro, Kuniko Kenmochi, Tadanao Suzuki, and Haruko Asouda
Chemical Abstracts 67, No. 23, 107404v (December 4, 1967)

4.29 ALCOHOLYSIS OF MARINE OILS

British Patent 1,076,706
Chemical Abstracts 67, No. 17, 81323r (October 23, 1967)

8.51 A MONOMERIC FORM OF PROCARBOXYPEPTIDASE A FROM THE SPINY PACIFIC DOGFISH

Lacko, Andras G., and Hans Neurath (Univ. of Washington, Seattle)
Chemical Abstracts 66, No. 21, 91843d (May 22, 1967)

4.11 ISOLATION AND CHARACTERIZATION OF THE N-METHYL DERIVATIVES OF 2-AMINOETHYLPHOSPHONIC ACID FROM THE SEA ANEMONE, ANTHOPLEURA XANTHOGRAMMICA

Kittredge, J. S., A. F. Isbell, and R. R. Hughes
Biochemistry 6, No. 1, 289-295 (January 1967)

The phosphonic acid analogs of choline phosphate (trimethyl-2-phosphonoethyl-ammonium hydroxide inner salt) and 2-methylaminoethylphosphonic acid were isolated in crystalline form from ethanolic extracts of the sea anemone, Anthopleura xanthogrammica. A small amount of 2-dimethylaminoethylphosphonic acid was detected during the process.

The three N-methyl derivatives of 2-aminoethylphosphonic acid were synthesized, and the structures of the isolated phosphonic acids were established by comparison with the synthetic compounds. The biological occurrence of the phosphonic acid analogs of ethanolamine phosphate, serine phosphate, and choline phosphate (the three major constituents of phospholipids) was established. [22 references]

[Abstracter: M. F. Tripple]

4.11 GAS-LIQUID CHROMATOGRAPHY OF TRIGLYCERIDE MIXTURES CONTAINING BOTH ODD AND EVEN CARBON NUMBER FATTY ACIDS

Litchfield, Carter, R. D. Harlow, and Raymond Reiser (Texas Agr. Expt. Sta., College Station)
Chemical Abstracts 67, No. 18, 83202z (October 30, 1967)

6.54 FISH MEAL: FOOD OF THE ANCIENTS

White, Philip R. (Anatolia College, Thessaloniki, Greece)
Science 156, No. 3779, 1178 (June 2, 1967)

Approval by the Food and Drug Administration to use fish meal as a food additive for human consumption brought to mind this quote from Arrian's account of the voyage of Nearchus along the eastern shore of the Persian Gulf in the year 325 B.C.

"Below the Gadrosians...dwell the people called "The Fish Eaters."....Thinking here to seize corn by force Nearchus attacked the town, but the natives showed freely their flour, ground down from dried fish; but only a small quantity of corn and barley....Only a few of them fish, for few have proper boats or any skill; for the most part it is the receding tide which leaves fish in pools which provide their catch. The more tender ones they eat raw, the larger and tougher ones they dry in the sun until quite sere and then pound them and make flour and a bread of them....Even their flocks are fed on dried fish so that the mutton has a fishy taste like the flesh of sea birds."

[Abstracter: M. F. Tripple]

6.54 PHYSICAL AND CHEMICAL PROPERTIES OF SALMON CAVIAR

Levanidov, I. P., and L. K. Bukhryakova
Chemical Abstracts 66, No. 25, 114706e (June 19, 1967)

8.53 (*) FAT AND CHOLESTEROL IN NUTS AND SHELLFISH [AND MODIFIED FAT DIETS]

Anonymous
Journal of the American Medical Association 202, 1158 (December 4, 1967)
Journal of the American Dietetic Association 52, No. 3, 241 (March 1968)

The response of serum cholesterol levels in humans to the dietary input of cholesterol and fatty acids in shellfish is discussed. Shellfish, though low in fat, have a high cholesterol level and produce a small hypercholesteremic response. The lipid content of crab, lobster, and shrimp is presented along with serum cholesterol responses. [Abstracter: M. F. Tripple]

*Item on back of card.

9.12 (*) SPAWNING OF HADDOCK IN CAPTIVITY

Hawkins, A. D., K. J. Chapman, and D. J. Symonds (Marine Laboratory, Department of Agriculture and Fisheries for Scotland, Torry, Aberdeen, Scotland)
Nature 215, No. 5104, 923-924, 925 (August 26, 1967)

Despite the commercial importance of the haddock, Melanogrammus aeglefinus, knowledge of the spawning behavior of this fish is limited. The time of spawning and the areas in which spawning occurs are known from studies of the distribution and abundance of sexually mature fish and the planktonic eggs and larvae. However, the conditions under which haddock spawn, usually at depths exceeding 100 meters, have prevented direct observations of reproductive behavior.

A small group of haddock kept in a laboratory aquarium spawned, and the authors were able to report on the behavior of the haddock. The spawning of these fish in captivity suggested that the reproductive behavior of haddock in the sea is complex, involves aggressive and courtship displays, and culminates in a sexual embrace. The pigment change in male haddock, the prominence played by sound production in courtship, and the increased development of the sound-producing apparatus in males during breeding season all suggested that this preliminary behavior plays an important part in reproduction. The observations in the aquarium were necessarily limited by the small number of fish involved and the limited volume of water. It would be premature to suggest that courtship occurs just off the sea bottom. Evidence provided by trawl catches of haddock suggests that spawning may be benthic or at least bathypelagic. [10 references] [Abstracter: M. F. Tripple]

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9.11 (*) OXYGEN SOLUBILITY IN SEA WATER: THERMODYNAMIC INFLUENCE OF SEA SALT

Green, E. J. (Carnegie Institute of Technology, Pittsburgh, Pennsylvania 15213), and D. E. Carritt (Department of Geology and Geophysics, Massachusetts Institute of Technology, Cambridge)
Science 157, No. 3785, 191-193 (July 14, 1967)

Previous workers have assumed that the solubility of oxygen in sea water is linearly related to the concentration of salt in the water. The authors of the present article show that the solubility declines exponentially with an increase in the concentration of salt, the deviation from linearity being nearly 0.6 percent. Moreover, they found that as the temperature increases, the salting-out coefficient decreases. [14 references] [Abstracter: L. Baldwin]

*Item on back of card.

9.19 (*) DDT RESIDUES IN PACIFIC SEA BIRDS: A PERSISTENT INSECTICIDE IN MARINE FOOD CHAINS

Risebrough, Robert W. (Institute of Marine Resources, University of California, Berkeley), Daniel B. Menzel, D. James Martin, and Harold S. Olcott
Nature 216, No. 5115, 589-590 (November 11, 1967)

The accumulation and biological concentration of dichlorodiphenyltrichloroethane (DDT) within the food chains of terrestrial, fresh-water, and estuarine ecosystems have been well documented. Significant residue concentrations in marine organisms have been found; however, these concentrations have usually been attributed to local sources of contamination. The present study is based on analyses of collections of birds, fish, and invertebrates from Pacific Ocean localities. The results indicate that DDT is a component of marine ecosystems and that pelagic species may accumulate high concentrations of DDT residues.

Although chlorinated hydrocarbons in solution or adsorbed to particulate matter are carried by rivers to the sea, transport of the hydrocarbons by water circulation cannot account for the observed distribution of DDT in the sea and the occurrence of DDT in remote areas. Chlorinated hydrocarbons readily evaporate with water from the land surfaces, become associated with particulate matter in the air, and are dispersed through the atmosphere by spraying operations. Therefore, wind transport and subsequent fallout in rain might account for the apparently universal occurrence of DDT and its metabolites in the ocean. [18 references] [Abstracter: M. F. Tripple]

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NUTRITIONAL STUDIES ON FISH IN ARIAKE BAY.
II - THE CONTENTS OF CHOLESTEROL AND PHOSPHATIDES
IN BOLEOPHTHALMUS PECTINIROSTRIS
AND ODONTAMBLYOPUS RUBICUNDUS
8.53

Yamazoe, Yoshitake, and Katuzo Ishii (Coll. Saga, Japan)
Chemical Abstracts 64, 10320g (March 28, 1966)

DAILY AND TIDAL COMPONENTS IN THE PERSISTENT
RHYTHMIC ACTIVITY OF THE CRAB, SESARMA
9.12

Palmer, John D. (Department of Biology, New York University, New York, N.Y. 10453)
Nature 215, No. 5096, 64-66 (July 1, 1967)

The spontaneous locomotor activity of an intertidal grapsoid crab, Sesarma reticulatum, was characterized by a clear-cut rhythm. This rhythmic activity had two well-defined components--one of 24 hours, spanning the bimodal lunar day, and one of 24.8 hours, spanning the mean solar day. [Abstracter: L. Baldwin]

ORGANIC COMPOSITION

OCEANOGRAPHY
ICHTHYOLOGY

ICHTHYOLOGY

POLLUTION

9.11 STUDIES ON THE ORGANIC MATTER IN SEA WATER
I - THE DISTRIBUTION OF CARBOHYDRATES IN WATERS
OF SOUTHERN HOKKAIDO

Kawahara, Hosaku, Yoshiaki Maita, and Jiro Ishii (Fac. Fish., Hokkaido Univ., Hakodate, Japan)
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 9, 825-833 (September 1967) (In Japanese; English summary)

Samples of sea water collected from 13 stations off the coast of Southern Hokkaido were analyzed for their carbohydrate and dissolved-oxygen content. Horizontally the Tsugaru warm current and the Oyashio cold current formed a water-mass boundary offshore of Cape Erimo (at 41°30′ N., 143°40′ E.). East of this water mass, the content of carbohydrates was higher and dissolved oxygen was more supersaturated; thus the number of phytoplankton was larger.

Vertically, the surface and subsurface water contained up to 1.3 milligrams per liter of total carbohydrate (expressed as the sucrose equivalent) and up to 0.7 milligram per liter of dissolved carbohydrate. The amount of dissolved oxygen that was found in these waters exceeded the amount that the theoretical solubility of oxygen would lead one to expect by from 1 to 2 milliliters per liter. The correlation coefficient between carbohydrates and the supersaturated dissolved oxygen was 0.39. The concentration of carbohydrates was maximum at depths of from 10 to 75 meters. [18 references] [Abstracter: L. Baldwin]

8.53 STUDIES ON THE LIPIDS OF JAPANESE LITTLENECK,
TAPES JAPONICA DESHAYES. II - COMPOSITION OF PHOSPHOLIPIDS

Yasuda, Shigejirō
Journal of Japan Oil Chemists' Society 16, No. 11, 596-600 (1967)

The composition of the acetone-insoluble lipids obtained from the Japanese littleneck clam (Tapes japonica Deshayes) was studied. The acetone-insoluble lipids were mainly comprised of phospholipids.

Silicic acid column chromatography of intact lipids and paper chromatography of the water-soluble hydrolysis products of phospholipids were found to be unsatisfactory for the analysis of constituents of the phospholipids. Thin-layer chromatography was not capable of separating plasmalogens from analogous diacylphospholipids. Two-dimensional thin-layer chromatography, based on the specific hydrolysis of plasmalogens to lysophospholipids in the presence of mercuric chloride spray reagent, was effective for the analysis of plasmalogens. This method was used to separate the phospholipids into individual phospholipids; lipid phosphorus was determined.

The results of the analysis showed that the phospholipids were rich in ethanolamine phospholipids. The percentages of these phospholipids were phosphatidyl ethanolamine, 23.1 percent; phosphatidyl ethanolamine (ethanolamine plasmalogen), 9.2 percent; and sphingo-ethanolamine, 17.8 percent. The percentages of other phospholipids were phosphatidyl choline, 19.8 percent; phosphatidyl serine, 10.8 percent; and phosphatidyl inositol, 6.0 percent. [24 references]
[Abstracter: M. F. Tripple]

9.19 STUDIES ON THE POST-MORTEM IDENTIFICATION
OF THE POLLUTANT IN THE FISH KILLED BY WATER POLLUTANT.
VI - CONFIRMATION METHOD OF CHROMIUM IN THE FISH

Kariya, Teiji (Dept. Fish. Fac. Agr., Tokoku Univ., Sendai, Japan), Shuko Suzuki, and Tsutomu Tsuda
Bulletin of the Japanese Society of Scientific Fisheries 33, No. 10, 942-947 (October 1967)

The authors tested the effectiveness of the diphenyl-carbazide method of detecting the presence of chromium in the bodies of fish killed by a chromium plating solution, a chromium-sulfate plating solution, and a chromium tanning solution. They concluded that the method could be used for postmortem identification of the pollutant even when a body had been washed for 24 hr. in running tap water. The steps in the procedure are tabulated. [Abstracter: L. Baldwin]

9.19 A WILD FISH SHOULD BE SAFE TO EAT

Ettinger, M. B., and Donald I. Mount (Federal Water Pollution Control Admin., Cincinnati, Ohio)
Chemical Abstracts 66, No. 23 104049b (June 5, 1967)

9.19 POLLUTION OF MARINE PRODUCTS BY RADIOACTIVE MATERIALS

Hiyama, Yoshio
Chemical Abstracts 67, No. 6, 25281p (August 7, 1967)

9.12 ALARM REACTION OF THE TOP SMELT, ATHERINOPS AFFINIS:
REEXAMINATION

Rosenblatt, Richard H., and George S. Losey, Jr. (Scripps Institution of Oceanography, University of California at San Diego, La Jolla 92307)
Science 158, No. 3801, 671-672 (November 3, 1967)

The skin of certain fishes contains a substance that is released by mechanical injury and that alters the behavior of fish of the same species. The new behavior, called the alarm reaction, is manifested by the fishes' forming a tight school, dropping to the bottom, refusing food, and dashing into cover. According to Pfeiffer (1963), the alarm reaction in fishes is restricted to members of the order Cypriniformes. However, Skinner et al. (1962) reported an alarm reaction from top smelt [Atherinops affinis (Ayres)], which is of the order Atheriniformes.

No alarm reaction was seen when the authors presented the top smelt with a methanol extract of whole top smelt. In fact, the methanol extract of top smelt was found to be an attractant, as was the methanol extract of shrimp. The authors interpret the alarm reaction seen by other investigators as an experimental artifact. [10 references] [Abstracter: M. F. Tripple]

9.125 PHYSIOLOGY OF THE SWIMBLADDER

Fange, Ragnar (Univ. of Göteborg, Sweden)
Chemical Abstracts 66, No. 11, 44501f (March 13, 1967)

Author	Page	Code
Aas, K.	24	8.51
Alford, John A.	5	2.01
Amoore, J. E.	15	7.80
Arai, Kimie	11	6.193
Asari, Takayasu	10	4.21
	24	4.21
Asouda, Haruko	24	8.51
Bathie, F. M.	13	7.45
Baumann, W. J.	23	4.11
Beaugé, L. A.	21	0.2
Berdyshev, G. D.	16	8.51
Bilinski, E.	15	8.59
Boyarskikh, G. V.	16	8.51
Bukhryakova, L. K.	24	6.54
Burden, B. A.	13	7.45
Buschlen, Karen	16	8.59
Butler, T. H.	5	1.85
Campbell, James W.	2	0.38
Carritt, D. E.	25	9.11
Chapman, K. J.	25	9.12
Chappelear, Patsy S.	13	7.0
Colvin, Thomas E.	9	2.117
Colwell, R. R.	22	0.5
Coulson, J. C.	19	9.19
Crabtree, A. N.	19	9.19
Davidkova, Eva	10	4.21
Deans, Harry A.	13	7.0
DeVillez, Edward	16	8.59
Dingle, J. R.	15	8.51
Drobeck, K. G.	3	1.82
Duncan, Charles L.	1	0.5
Dyer, W. J.	13	7.593
Egami, Fujio	13	7.591
Ehrlich, Paul	3	0.7
Endo, Kinji	14	7.591
Enright, J. T.	10	2.12
Ettinger, M. B.	26	9.19
Fahmi, H. Dariush	14	7.591
Fahlen, Lars A.	9	2.1128
Fange, Ragnar	26	9.125
Fowler, Josephine	23	6.54
Fraser, Doris I.	13	7.593
Gangal, S. V.	16	8.51
Gilbert, Daniel L.	21	0.35
Gilbert, R. J.	5	2.05
Girenko, V. N.	22	2.1111
Green, E. J.	25	9.11
Grzeszczak-Swietlikowska, U.	10	5.41
Gullmar, B.	6	2.05
Hammes, Gordon G.	2	0.3
Harlow, R. D.	24	4.11
Hasanen, E.	18	9.15
Hawkins, A. D.	25	9.12
Heusner, A. A.	10	2.12
Hiyama, Yoshio	26	9.19
Hiyoshi, Akira	10	4.21
	24	4.21
Hobbs, Betty C.	5	2.05
Holman, Ralph T.	4	0.7
Hourston, A. S.	17	9.17
Hughes, R. R.	24	4.11
Idler, D. R.	15	8.59
	16	8.59
Isaev, F. A.	24	8.51
Isbell, A. F.	24	4.11
Ishii, Jiro	26	9.11
Ishii, Katuzo	25	8.53
Ishii, Takeo	19	9.2
Jamieson, Alan	23	8.51
Jannasch, Holger W.	21	0.5
Jebsen, J. W.	24	8.51
Jonas, R. E. E.	15	8.59
Kadowaki, Yoko	14	7.591
Kariya, Teiji	26	9.19
Karnovsky, Morris J.	14	7.591
Kashiwada, Ken-ichi	9	5.41
Kawahara, Hosaku	26	9.11
Kendall, Margaret	5	2.05
Kenmochi, Kuniko	24	8.51
Kertesz, Z. I.	1	0.6
Kesteven, G. L.	4	1.0158
Kishida, Hideko	14	7.591
Kittredge, J. S.	24	4.11
Kobayashi, Riki	13	7.0
Kolehmainen, S.	18	9.15
Komori, Yoshihiro	23	4.21
Korotaev, G. K.	16	8.51
Lacko, Andras G.	24	8.51
Larkin, P. A.	17	9.17
Levanidov, I. P.	24	6.54
Lewin, Isaac	23	6.54
Litchfield, Carter	24	4.11
Little, C.	1	0.33
	9	4.21
Losey, George S., Jr.	26	9.12
Lynn, William S.	24	4.21
Magar, N. G.	16	8.51
Maita, Yoshiaki	26	9.11
Mangold, H. K.	23	4.11
Martin, D. James	25	9.19
Menzel, Daniel B.	25	9.19
Miettinen, J. K.	18	9.15
Miller, Bruce Stuart	17	9.14
Misra, T. N.	22	0.2
Molin, N.	6	2.05
Mount, Donald I.	26	9.19
Muramatsu, Takashi	13	7.591
Neo, M.	3	1.0154
Neurath, Hans	22	0.38
	24	8.51
O'Brien, P. J.	1	0.33
	9	4.21
Ohata, Susumu	10	4.21
	24	4.21
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